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PRACTICES USED FOR HOME CANNING OF FRUITS AND VEGETABLES

UNITED STATES DEPARTMENT OF AGRICULTURE

HOME ECONOMICS RESEARCH REPORT NUMBER 43

PREPARED BY SCIENCE AND EDUCATION ADMINISTRATION

ABSTRACT

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Because many people had questions and problems about canning fruits and vegetables, a nationwide survey was conducted to obtain a clear picture of the home canning situation. Data were collected on fruit and vegetable canning procedures and equipment used by households, their sources of instruction, and food spoilage observed. This information was based on practices followed in 1975, when one out of three households canned fruits, vegetables, or both. These products were canned in only 20 percent of the households in large metropolitan areas compared with 50 percent in rural areas. Tomatoes were the most popular item and were canned by three out of four households. Other vegetables, pickles, and fruits were each canned by one out of two households.

Some procedures followed by many home canners are not recommended by the U.S. Department of Agriculture, such as packing or filling jars too tightly, reusing flat metal disks from the two-piece metal lid with band, and using the open-kettle method for fruits and vegetables. Approximately one-fourth of the households reported some spoilage in their home-canned fruits and vegetables. Three out of four canners believed that it was due to lids that failed to seal properly. Although the survey did not determine the actual cause, information given by home canners indicated that some spoilage undoubtedly resulted from improper procedures.

KEYWORDS: Home canning survey, home canning procedures, home canning practices, water-bath method, pressure-canner method, open-kettle method, food preservation, heat processing, home-canned food spoilage, home-canned fruits, home-canned vegetables.

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PRACTICES USED FOR HOME CANNING OF FRUITS AND VEGETABLES

By Carole A. Davis and Louise Page[1]

Many people are canning food at home today. Their number is likely to increase because of economic uncertainty, unemployment, and adverse weather conditions in some areas, which can affect the supply and cost of commercially canned foods.

Reports received in recent years through the Extension Service or directly from the consumer indicate that many home canners are experiencing problems, ranging from difficulty in obtaining proper canning supplies to spoilage of home-canned food, caused by using improper procedures or inappropriate equipment. This spoilage not only results in economic loss but may constitute a hazard to health or life if the food is consumed. Since 1925, only a few deaths have been attributed to botulism, an often fatal food-borne poisoning, from commercially canned products. However, during the same period, over 700 deaths have been traced to botulism caused by improperly home-canned foods. In 1974, there were 20 outbreaks of botulism, the largest number since 1935. They affected 30 persons, of whom 7 died, 5 from home-canned foods. The increase in home canning by inexperienced persons is believed to have been an important factor.

The public relies for guidance and factual information about home canning on the U.S. Department of Agriculture because it has for many years issued publications based on research to help the home canner. Although the periodic nationwide surveys of household food consumption conducted by the Consumer and Food Economics Institute report some information on home canning, they are not designed to investigate canning practices. Consequently, to provide the most effective help, the survey reported here was undertaken to obtain information on fruit and vegetable canning procedures and equipment used by households, their sources of instruction, and spoilage they experienced.

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[1]Consumer and Food Economics Institute, Science and Education Administration, Hyattsville, Md. 20782.

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PROCEDURES

Sample and Questionnaires

The home canning survey was conducted by Response Analysis Corporation, Princeton, N.J., during the spring of 1976 for the Department's Science and Education Administration. A statistically valid sample was drawn to represent all private households in the conterminous United States consistent with the latest available census data. The households were allocated proportionately to (1) Standard Metropolitan Statistical Areas (SMSA's) of more than 1 million population, (2) SMSA's of less than 1 million population plus all other urban territory as defined for census purposes, and (3) rural territory as defined for census purposes other than rural territory that might be included in SMSA's.

A total of 5,000 households were assigned for screening to locate those engaged in home canning. Of these households, 2,200 represented the designated sample for a national study of consumers' food-related behavior, attitudes, and motives, conducted by Response Analysis Corporation, in 1976 for the Department's Economics, Statistics, and Cooperatives Service (ESCS). The questionnaire for this study included a question to identify the presence of a home canner of fruits, vegetables, or both in the household.

At the conclusion of the personal interview for this ESCS study, those who canned or preserved fruits or vegetables in 1975 were asked to self-administer a supplemental questionnaire about the canning they did in 1975. (See appendix, exhibit 1.) Questions for this schedule originated in the Science and Education Administration. To increase the size of the sample, an additional 2,800 households were screened in the same locations used in the national ESCS study. Canners in these households, identified through a screening questionnaire (see exhibit 2), were also asked to complete the supplementary questionnaire.

For the 1976 home canning survey, questions were asked about (1) demographic characteristics of the respondent, (2) sources of home canning instructions used, (3) kinds and amounts of fruits and vegetables canned, (4) methods and procedures used, (5) extent of spoilage observed, (6) food safety awareness and practices followed in home canning, and (7) plans for home canning.

The questionnaire was pretested by the contractor in at least two sections of the country and in both urban and rural areas. Necessary revisions were made following pretesting sessions.

Efforts were made throughout the field phase of the study to find designated respondents at home and to urge their cooperation. Interviewers were instructed to make an original visit and up to three callbacks to contact the canner at each eligible household and up to three additional callbacks to collect the completed questionnaire.

Of 3,178 households screened, 1,417 had completed personal interview questionnaires for the ESCS study and the other 1,761 households were screened out of the supplementary sample. A total of 979 canning questionnaires were obtained from the 1,031 home canners located from the ESCS personal interview

sample and the additional screening. Of the total questionnaires, 901 were used for the analysis because 78 had missing or inconsistent data.

Of the 5,000 housing units assigned for screening, 403 were ineligible because they were vacant houses, vacation homes, or boarding or rooming houses, leaving a total of 4,597 assumed eligible households, for example, households that might have canners. Applying the 32.4 percent incidence of canning households (1,031 canning households out of 3,178 households screened) to the total assumed eligible households (4,597) gives an estimated 1,489 eligible home canners in the sample. Canning questionnaires were obtained from 979 or 66 percent of these canners. Completed questionnaires were not obtained from the remaining eligible households because the canner or designated respondent could not be found at home, refused to complete the questionnaire, or interviewers were unable to contact the household within the survey period. Since a weight computed for each sample location was used to adjust for differences in interview completion rates in various regions, the respondents used in the analysis of data totaled 1,346 rather than 901.

Data Handling

The contractor was responsible for placing and obtaining the self-administered questionnaires, coding, keypunching, and making initial machine tabulations. Analysis of findings and additional tabulations were done by the Consumer and Food Economics Institute. Data were tabulated as to the percentage of total households using certain canning methods, procedures, and equipment; total volume of fruits, vegetables, or both canned; and spoilage observed in terms of the home canner's employment status, education, age, household size, total family income, and whether the respondent had children. Additionally, to further examine demographic characteristics of canners, data were tabulated according to the percentage of respondents who (1) used a specific method, procedure, and type of equipment, (2) canned a specific volume, and (3) reported spoilage of various fruits, vegetables, or both.

RESULTS AND DISCUSSION

The eligible households and completed home canning questionnaires in four regions and three types of communities are summarized in table 1. One out of three households canned fruits and vegetables at home in 1975--about the same proportion that canned fruits and vegetables in 1964, but down from the two out of five households reported for 1954.[2] [3] In 1975, the incidence of canning decreased with the degree of urbanization, as expected. Fruits and vegetables

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[2]Redstrom, R. Household production and preservation of food for home use in the United States by region, 1964. U.S. Dept. Agr., Agr. Res. Serv. Microfilm Ser., 25 pp. 1972.

[3]U.S. Department of Agriculture, Agricultural Research Service. Home freezing and canning by households in the United States--by region. Household Food Consumption Survey, 1955, Rpt. No. 11, 72 pp. 1957.

were canned by one out of two households in rural areas, as compared with one out of five households in large metropolitan areas with a population of more than 1 million. (Comparable findings for 1964 and 1954 are not available because different categories of urbanization were used in these earlier surveys.) A smaller percentage of households in the Northeast than in the North Central, South, and West canned these items in 1975 as was true in 1964 and 1954. A large proportion of the known households canning fruits and vegetables completed the questionnaire with little variation by region or community size.

Table 1.--Eligible households and completed home canning questionnaires by region and community size, 1975

Item	Households screened	Households with known canners[1]		Completed questionnaires[2]	
	Number	Number	Percent	Number	Percent
Total households	3,178	1,031	32	901	87
Region:					
Northeast[3]	801	157	20	134	85
North-central	961	359	37	313	87
South	908	314	35	273	87
West	508	201	40	181	90
Community size:					
Large metropolitan[4]	1,268	259	20	220	85
All other urban[5]	1,213	403	33	347	86
Rural	697	369	53	334	90

[1]Of total households screened.
[2]Of known canners.
[3]Includes Maryland and Fairfax, Va.
[4]Standard Metropolitan Statistical Areas (SMSA's) of more than 1 million population.
[5]SMSA's of less than 1 million population and all other urban.

Demographic Characteristics of Home Canners

Some selected characteristics of fruit and vegetable canners in households surveyed for 1975 are as follows:

Characteristic	Households (percent)[1]
Employment:	
Currently employed:	
Full time	22
Part time	18
Not employed	56
Education:	
Grade school or less	17
High school or less	18
High school graduate	36
Vocational training	5
College or more	22
Age:	
Under 25	10
25-34	21
35-49	28
50-64	24
65 and over	15
Household size:	
1	9
2	31
3 or 4	38
5 or more	22
Income level:	
Under $5,000	14
$5,000-$12,499	30
$12,500-$19,999	27
$20,000 and over	11
Life cycle:	
Children	53
No children	47

[1]Households canning totaled 1,346. Individual categories do not of necessity total 100 percent because all respondents did not furnish all information and because of rounding.

The profile of the surveyed home canner indicates that--

. A little more than half of the home canners were not employed. Of those working, about half held full-time (more than 30 hours per week) jobs.

. Two out of five home canners were high school graduates, with about one out of five having some college training.

. The usual home canner was between 25 and 64 years of age (2 out of 10 were 25-34 years, 3 out of 10 were 35-49 years, and 2-3 out of 10 were 50-64 years). Only 1 out of 10 was younger and 1 out of 7 was older.

. About 60 percent of canners came from households with a total family income between $5,000 and $19,999; approximately 15 percent had incomes under $5,000 and 10 percent had incomes of $20,000 and over.

Some additional characteristics include--

. Canners under 50 years of age generally came from households with three or more members, whereas those 50 years and older lived in one- or two-member households.

. Proportionately more of those canners without children and who were employed worked full time.

. Those with total family incomes above $12,500 were more likely to be between 25 and 49 years of age.

. Almost three-fourths of canners had at least 2 years of canning experience.

. Of those who canned in both 1974 and 1975, about 10 percent had some food spoil in both years, whereas 15 percent had spoilage in just the 1 year.

Demographic characteristics--employment, education, age, household size, total family income, and whether the respondent had children--are tabulated for canners according to the source of instruction followed, amount canned, type of container and lid used, specific method (boiling-water bath, pressure, oven, or open kettle) used for canning fruits and vegetables, and spoilage observed when a particular method or type of equipment had been used. These data are reported in appendix tables 1-12.

Sources of Canning Instructions

Home canners obtained instructions from many sources, some more reliable than others. They included--

Source	Respondents (percent)[1]
Friends or relatives	61
Cookbooks	43
Magazines or newspapers	12
Extension Service publications	11
Personal recipe or experience	10
Manufacturer's cookbook	10
U.S. Department of Agriculture publications	9

[1]Households canning totaled 1,346. Components do not total 100 percent because more than 1 response was possible.

Friends or relatives were the source of instructions for 6 out of 10 canners, whereas 4 out of 10 used cookbooks. Magazines or newspapers, Extension Service bulletins, personal recipes, canning equipment manufacturer's cookbooks, and USDA publications[4] were each used by about 1 out of 10 canners. Some of the instructions in cookbooks, magazines or newspapers, and extension publications, however, could have originated from USDA research. Even some of the directions obtained from friends or relatives could have come originally from USDA material.

A greater percentage of those with some college education used USDA and Extension Service publications. More of those under 35 years and proportionately more not employed obtained instructions from friends or relatives. More canners under 50 years of age than older, more with a high school education than less, more from households with five or more members than one member, and more with annual incomes of $12,500 or above than under $5,000 used cookbooks as a source of instruction. Proportionately more of those having spoilage in both 1974 and 1975 used cookbooks.

Examination of the source of instruction used by canners, based on their demographic characteristics, showed no consistent relationships (app. table 1). However, a greater percentage of those who used personal recipes or experience than those who used other sources had not completed high school (fig. 1). Also, those who used more reliable sources of instruction, such as USDA or extension bulletins, were more likely to have had some college education. Those using personal recipes were more apt to be over 50 years of age than those using other sources of instruction.

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[4]U.S. Department of Agriculture, Agricultural Research Service. Home canning of fruits and vegetables, Home and Garden Bul. 8, 32 pp., 1976; How to make jellies, jams, and preserves at home, Home and Garden Bul. 56, 34 pp., 1975; and Making pickles and relishes at home, Home and Garden Bul. 92, 32 pp., 1970.

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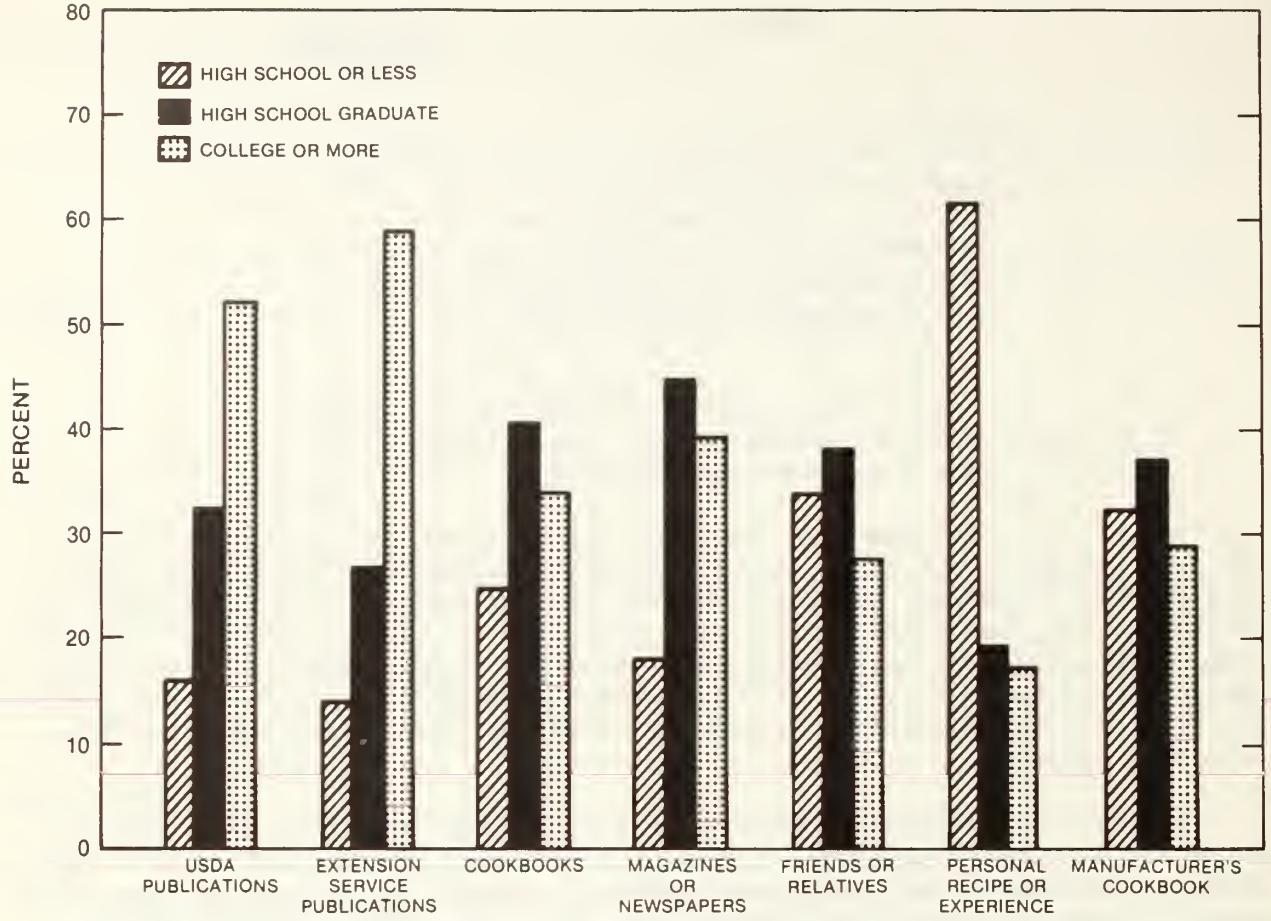


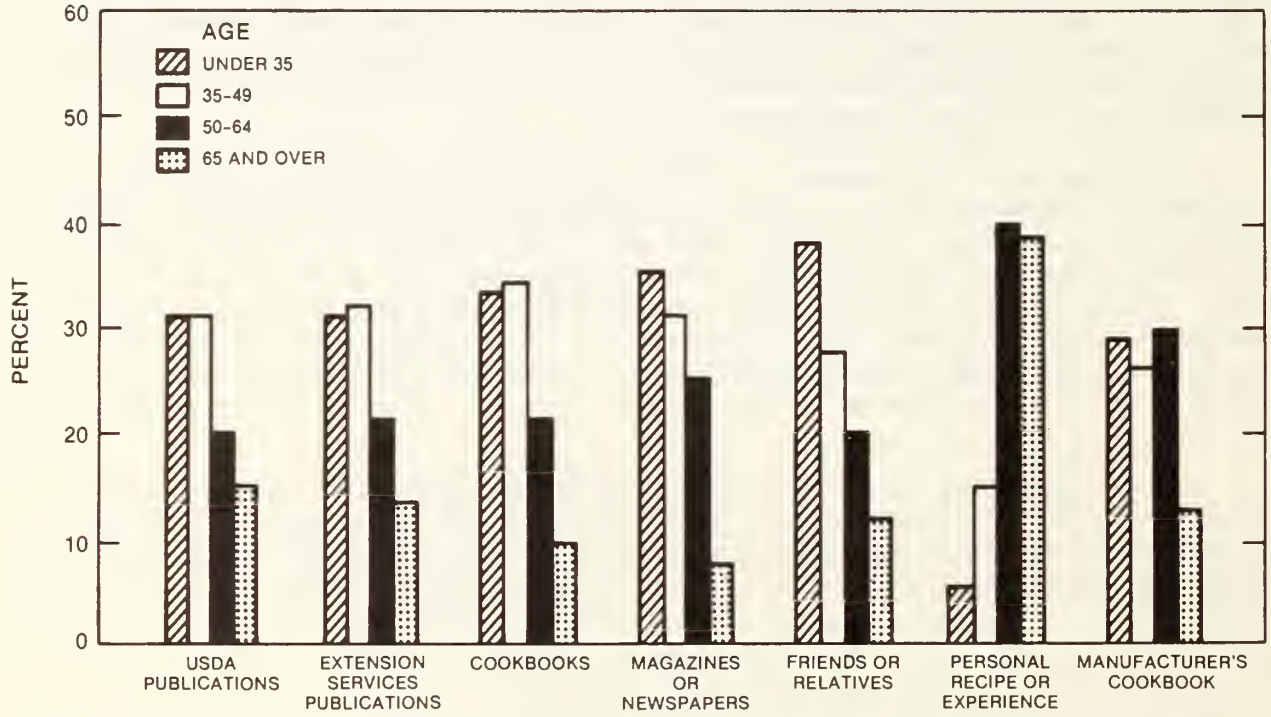


Figure 1.--Educational and age profiles of canners who used various sources of instruction.

Demographic characteristics of home canners using USDA publications and those using Extension Service bulletins were similar (app. table 1). Also, they were similar for those who used cookbooks and those who used magazines or newspapers as a source of instruction.

Kinds and Amounts of Fruits and Vegetables Canned

The proportion of households canning various products in 1975 was as follows:

Product	Households canning (percent)[1]
Tomatoes	73
Fruits	56
Low acid vegetables	51
Pickles	48
Jams	41
Jellies	41
Tomato sauce	20
Vegetable mixtures	18

[1]Totaled 1,346.

Tomatoes, the most popular product, were canned by about 7 out of 10 households in 1975. Low acid vegetables, pickles, and fruits were each canned by about 5 out of 10 households; tomato sauce and vegetable mixtures, each by about 2 out of 10; and jams and jellies were each preserved by about 4 out of 10 households. Beans, including lima, snap green, and wax, were canned by about 4 out of 10 households and beets by more than 2 out of 10 households. Apples and peaches were among the most commonly canned fruits, each being canned by about 3 out of 10 households. Cucumbers, undoubtedly processed as pickled products, were canned by about 3 out of 10 households.

In contrast, in 1954, tomatoes and peaches were the foods most often canned, with beans next. At that time, homemakers put up fruits as jellies, jams, or preserves more often than in any other form. In fact, nearly one-fourth of the households canning any fruit preserved all of it as jellies, jams, and similar products.

The number of different-sized jars of fruits and vegetables, excluding jams and jellies, canned by households in 1975 was converted to quarts and totaled. Three out of four households canned less than 100 quarts during the year, as shown in the following data:

Quarts (number)	Respondents (percent)[1]
Less than 12	10
12-24	15
25-99	46
100-199	15
200 or more	10

[1]Households canning fruits and vegetables, other than only jams and jellies, totaled 1,252. Components do not total 100 percent because all respondents did not furnish all information and because of rounding.

Certain trends are apparent when comparing volume of fruits and vegetables canned and household size (fig. 2). As would be expected, as the volume of canned products increased from less than 12 to 200 quarts, an increasingly smaller proportion of one-person households tended to can at each volume level; of those canning 200 or more quarts, fewer were from one-member households. Less expected was the finding that the largest share of canning at each level, except at 200 or more quarts, tended to be by three- or four-member households. Each household size, except the one-member category, accounted for about 30 percent of those who canned 200 or more quarts. At each volume level, two-member households consistently accounted for 30 to 35 percent of those canning, except at the 12- to 24-quart level, where the share dropped to 20 to 25 percent. Our findings imply that the presence of children is not a determining factor as to whether there is canning in the household (app. table 2).

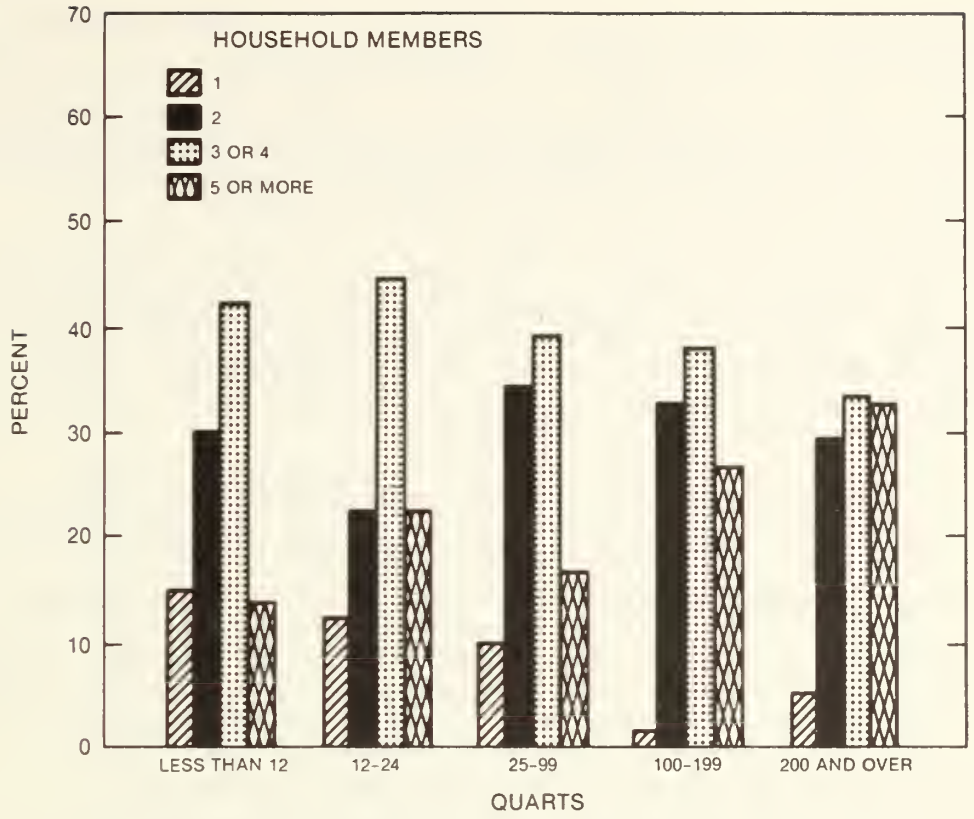
The volume of fruits and vegetables canned appeared not to be related to the employment status of canners. About 50 to 60 percent of the canners at each volume level were not employed outside the home (app. table 2). Moreover, little difference was evident in the amount canned by those who were employed either full or part time; about 20 to 25 percent were from either group at each level.

Those 50 years and older generally canned almost as many fruits and vegetables as those under 50. They accounted for about 40 to 45 percent of the canning done at each volume except at the 12- and 24-quart level (fig. 2).

At each volume, a smaller proportion of those at income levels under $5,000 as well as at $20,000 and over tended to can these foods than those at middle income levels (app. table 2). Low income families may be less likely to have the time or other resources for canning or may not be as apt to consider canning as a means of extending the food budget compared with middle income families.

Home Canning Equipment Used

Containers.--Most canners, or 94 percent, used jars designed especially for canning when processing fruits and vegetables, other than jams and jellies (app. table 3). More than 33 percent used other jars, such as for peanut



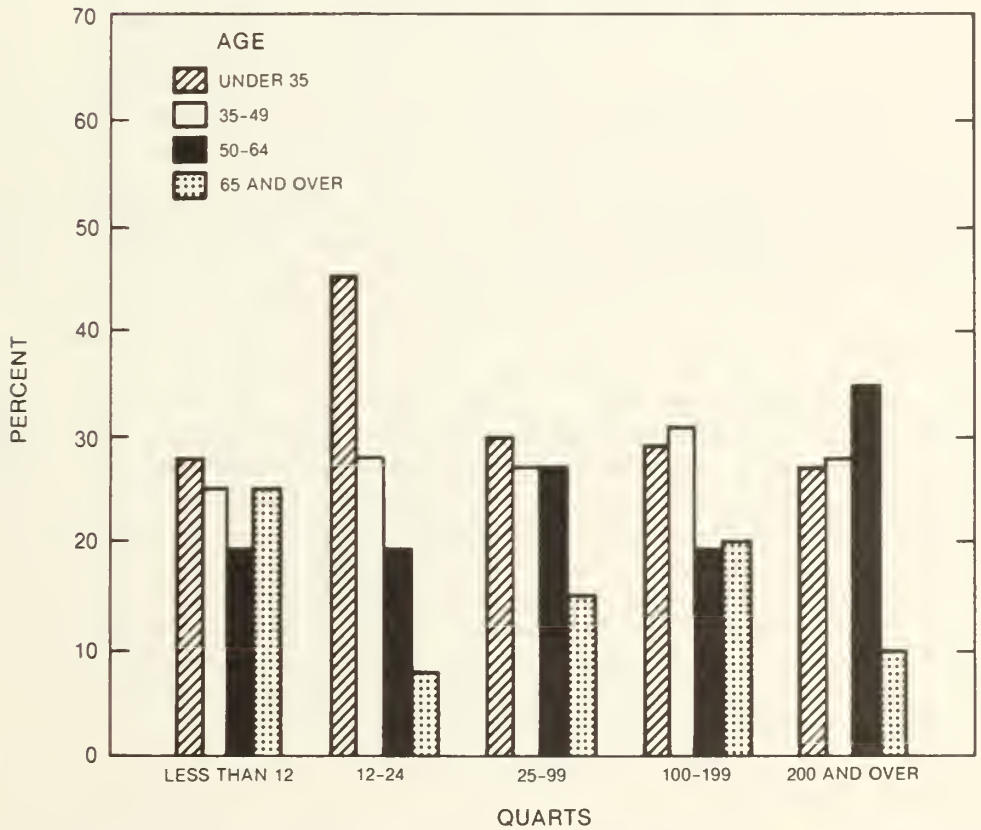


Figure 2.--Household size and age profiles of those who canned various amounts of fruits and vegetables.

butter, coffee, and salad dressing. Therefore, some canners used both standard home canning and nonstandard jars.

The Department recommends the use of jars designed especially for home canning so that they will be properly heat tempered, resistant to mechanical shock, of the right size for the established processing time and temperature, and the proper size to fit standard home canning closures.

More canners with at least 2 years than with 1 year of canning experience used jars not designed for home canning. A greater percentage of those having spoilage in 1974 and 1975 than those not having spoilage also used nonstandard jars. Demographic characteristics were similar for canners who used standard home canning jars and those who used nonstandard jars (app. table 3), with more than one-third reporting use of both types.

The size and number of jars used for canning fruits and vegetables, other than only jams and jellies, by households (1,216) in 1975 are as follows:

Jars (size and number)	Households (percent)
½ pints, total	12
Less than 50	10
50-99	2
100-249	--
250 or more	--
Pints, total	64
Less than 50	46
50-99	13
100-249	4
250 or more	1
1½ pints, total	3
Less than 50	3
50-99	([1])
100-249	--
250 or more	--
Quarts, total	86
Less than 50	45
50-99	19
100-249	18
250 or more	4
2 quarts (½ gallon), total	6
Less than 50	5
50-99	1
100-249	--
250 or more	--

[1]Less than 1 percent.

Since less than 1 percent used tin cans, the findings were not included.

The most popular sizes of home canning jars were the quart and the pint, used by about 85 and 65 percent of those canners, respectively. Only about 10 percent used half-pint jars and relatively small percentages used the 2-quart and 1½-pint jars. USDA publications primarily contain processing recommendations for foods canned in quart and pint jars. However, processing recommendations are included for a few products in half-pint jars.

Lids.--Flat metal lids with metal bands were the most popular kind for home canning of fruits and vegetables, other than jams and jellies. Jar lids or tops used by respondents are as follows:

Jar lid or top	Respondents (percent)[1]
New flat metal lid, metal band (2-piece)	90
Paraffin	13
Reused flat metal lid, metal band (2-piece)	9
Porcelain-lined zinc cap with rubber ring	8
Glass with rubber ring and wire bail	5
Glass with rubber ring and metal band	3
Plastic flat lid with metal band	2
Plastic film	0
Other	4

[1]Households canning fruits and vegetables, other than only jams and jellies, and using jars totaled 1,216. Components cannot be totaled to 100 percent because more than 1 response was possible.

Directions are included in USDA publications for the use of zinc caps as well as two-piece lids with flat metal disks and bands. However, the reuse of flat metal lids is not recommended because once an indentation has been made in the sealing compound by the jar rim, the lid may not seal properly the next time. About 10 percent of canners reported reusing these lids. Although paraffin should be used only for jellies, 13 percent of canners used paraffin for sealing fruit and vegetable products.

Comparison of demographic characteristics of users of new flat metal lids (the most popular of the acceptable jar closures) with those of users of reused flat metal lids and paraffin (both unacceptable closures) shows little difference (app. table 4). Reusers of flat metal lids, though, compared with users of new flat metal lids, tended to be a little younger, better educated, and with a higher percentage at both lower and upper income levels and a lower percentage of not employed. Paraffin users tended to be a little older, better educated, and with a higher proportion in the top income bracket than those using the other two kinds of lids.

Home Canning Processing Methods Used

The processing methods and households canning fruits and vegetables in 1975 are as follows:

Method	Households (percent)[1]	Method	Households (percent)[1]
Boiling-water bath, total	61	Pressure canner, total (con.)	
Fruits	53	Vegetable mixtures	38
Tomatoes	52	Pickles	4
Tomato sauce	40	Jams	2
Low acid vegetables[2]	40	Jellies	2
Vegetable mixtures[2]	34		
Pickles	44	Open kettle, total[2]	70
Jams	13	Fruits	44
Jellies	10	Tomatoes	35
		Tomato sauce	43
Pressure cooker (saucepan), total	10	Low acid vegetables	14
Fruits	4	Vegetable mixtures	26
Tomatoes	4	Pickles	57
Tomato sauce	4	Jams	85
Low acid vegetables	10	Jellies	87
Vegetable mixtures	5		
Pickles	2	Oven, total[2]	2
Jams	2	Fruits	1
Jellies	3	Tomatoes	1
		Tomato sauce	(3)
Pressure canner, total	31	Low acid vegetables	(3)
Fruits	16	Vegetable mixtures	(3)
Tomatoes	21	Pickles	--
Tomato sauce	18	Jams	1
Low acid vegetables	47	Jellies	1

[1]Total percentage of households using each method is based on number of households canning (1,346); percentage using method for a specific food is based on number of households that canned that product. Components do not add to the total because more than 1 response is possible and because the bases are different.

[2]Results in inadequate processing, except open-kettle method for jams and jellies.

[3]Less than 1 percent.

About 7 out of 10 households used the open-kettle method for processing fruits and vegetables, including jams and jellies, and 6 out of 10 used the boiling-water-bath method. The pressure canner was used by 3 out of 10 canners, and 1 out of 10 used the pressure cooker (saucepan), which holds only pints. Few used the oven method.

Based on the total number of respondents, as their age decreased, they were more likely to use the boiling-water bath for canning. It was used by more of those who had completed high school or some college and by more households with three or more members. As the level of education decreased from college to less than high school training and as their age increased, canners were more likely to use the open-kettle method.

The Department recommends the boiling-water-bath method for processing acid products, such as fruits, tomatoes, pickles, and jams. These foods have a pH of 4.6 or below. The use of a pressure canner or pressure cooker (saucepan) is recommended for low acid foods or those with a pH above 4.6, which includes all vegetables except tomatoes. Processing times and temperatures have not been established by the Department for tomato sauce and vegetable mixtures.

Open-kettle canning is not recommended. With this method, food is cooked in an ordinary kettle, then packed into hot jars and sealed. It is not processed after packing in the jars. Open-kettle canning is not safe because temperatures obtained are not high enough to destroy all the spoilage organisms that may be in low acid foods. Spoilage bacteria may also enter the food when it is transferred from kettle to jar and thus make canning by this method undesirable for such acid foods as fruits, tomatoes, and pickles.

Oven canning is not safe because jars may explode, causing personal injury or damage to the oven. Also, during oven processing, the food in jars does not reach a high enough temperature to insure destruction of spoilage bacteria in low acid foods.

Fruits, Tomatoes, and Pickles.--Similarity was found in the use of the boiling-water-bath method among respondents who canned fruits, tomatoes, and pickles, with about one-half of the canners using this method for each of these foods (app. table 5). Greater variation was found in the use of the open-kettle method, with about 6 out of 10 canners using it for pickles, 4 out of 10 for fruits, and about 3 out of 10 for tomatoes. Few canners used pressure methods for pickles, but about 2 out of 10 used them for tomatoes and fruits. The oven method was little used.

Comparison of users of the two methods most widely employed for canning these foods--the boiling-water bath, which is recommended, and the open kettle, which is not--shows that--

. Users of the boiling-water-bath method tended to be better educated and younger (fig. 3).

. Users of the open-kettle method tended to come from two- to four-member households; they were more likely to be not employed and to come from households with lower incomes and without children (app. table 5).

Tomato Sauce.--Processing methods utilized most frequently for this product were, in descending order, the open kettle, boiling-water bath, and pressure canner (app. table 5). Only a small percentage of those who canned tomato sauce used the pressure-cooker (saucepan) and oven methods. Procedures have not been developed for this product by the Department. Depending on the amount of low acid vegetables used in preparing this product, the acidity may be low enough that pressure methods of canning are desirable.

Proportionately more of those who used the boiling-water-bath method for canning tomato sauce tended to have some college education and to come from households with children than those using the pressure-canner and open-kettle

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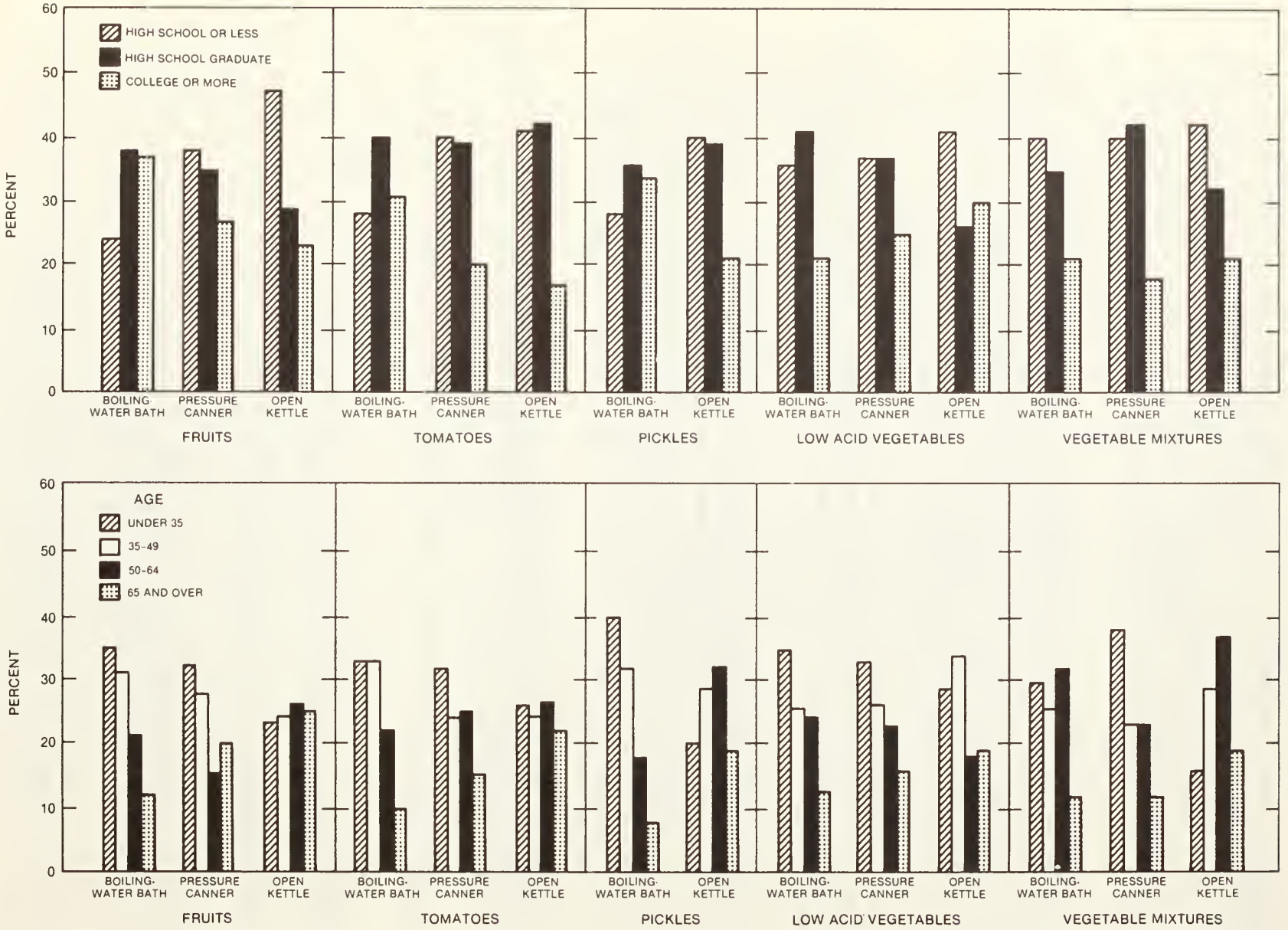

Figure 3.--Educational and age profiles of those who used various methods to can fruit and vegetable products.

methods. Proportionately more of those who used the open-kettle method were older than those using the other two methods.

Low Acid Vegetables and Vegetable Mixtures.--Low acid vegetables and vegetable mixtures were canned most frequently using, in descending order, the pressure-canner, boiling-water-bath, and open-kettle methods (app. table 5). Pressure-cooker (saucepan) and oven methods were used by only a small percentage of canners.

More of those who canned low acid vegetables using the open-kettle method tended to have some college training and a lower percentage were apt to be high school graduates as compared with those using the other methods (fig. 3). Of those canning vegetable mixtures, percentages of canners that had not completed high school were similar for the three methods, but more of those using the pressure canner tended to be high school graduates and fewer had some college than for the other two methods.

Age distribution was similar for those canning low acid vegetables using the boiling-water-bath and pressure-canner methods. However, proportionately more canners using the open kettle were 35 to 49 years of age than those 50 to 64 years (fig. 3). Fewer of those using the open-kettle method for canning vegetable mixtures tended to be under 35 years of age than those using the other two methods, whereas a greater percentage of those using the pressure canner tended to be under 35 and a smaller percentage 50 years or older.

More of those using the open-kettle method for these products tended to have annual incomes of $5,000 or less than those using the other methods (app. table 5). However, the largest proportion of canners for all methods tended to come from the two middle income levels combined.

Jams and Jellies.--Most persons who canned jams and jellies used the open-kettle method, with only about 10 percent using the boiling-water bath (app. table 5). Less than 5 percent used the pressure or oven methods.

Similar percentages of those using the two major methods reported for jams had not completed high school; however, more of those using the boiling-water bath were apt to have some college training than those using the open kettle. This relationship tended to be true for jellies. More of those using the boiling-water bath for canning jams and jellies tended to be under 35 than those using the open-kettle method. Percentages of those having annual incomes of less than $5,000 were similar for those who used both methods for canning jams; however, slightly more of those who used the open kettle than those who used the boiling-water bath had annual incomes of $20,000 or more. More of those using the open kettle for jellies than those using the boiling-water bath tended to have incomes of less than $5,000; percentages of those with incomes above $20,000 were similar for those who used both methods.

Home Canning Procedures Used

Respondents' practices concerning general canning procedures, such as filling containers, increasing processing time when using a pressure cooker

(saucepan), and adjusting processing time or temperature because of high altitude, are reported in the following section. Since these procedures can affect the adequacy of the process, they must be used correctly along with the proper home canning method for the specific food. All canners did not supply all information requested on the performance of these procedures.

Type of Pack for Filling Containers.--Fruits and vegetables may be packed raw into jars or preheated and packed hot. The following procedures were used by households for packing fruits and vegetables, excluding jams and jellies, in 1975:

Procedure	Households (percent)[1]
Used raw (cold) pack procedure for packing fruits and vegetables, total	52
Packed raw fruits or vegetables:[2]	
Tightly into jars[3]	46
Fairly loosely into jars	41
Loosely into jars	4
Used raw (cold) pack procedure for packing peas, corn, and limas, total	15
Packed raw peas, corn, limas:	
Tightly into jars	37
Fairly loosely into jars	52
Loosely into jars[3]	10
Placed raw fruits or vegetables into jars:[4]	
Covered with boiling liquid[3]	49
Covered with hot, but not boiling, liquid	23
Covered with cold liquid	20
Did not add liquid	12
Used hot pack procedure for packing fruits and vegetables, total	74
Packed heated fruits or vegetables:[2]	
Tightly into jars	42
Fairly loosely into jars[3]	50
Loosely into jars	5
Placed heated fruits or vegetables into jars:[4]	
Covered with boiling liquid[3]	58
Covered with hot, but not boiling, liquid	26
Covered with cold liquid	2
Did not add liquid	13

[1]Households canning totaled 1,252.

[2]Components cannot be totaled to 100 percent because all respondents did not furnish all information and because of rounding.

[3]Correct procedure.

[4]Components cannot be totaled to 100 percent because more than 1 response was possible and because of rounding.

As these data show, about half the canners used the raw pack, in which unheated food is placed into jars. More of those with at least 2 years of canning experience than with 1 year used the raw pack.

Raw peas, corn, and lima beans must be packed loosely into jars because, unlike other raw vegetables, they will expand during processing. If they are packed tightly, there is danger of underprocessing. Only 15 percent of canners used the raw pack for peas, corn, and lima beans, and of this number about 10 percent correctly packed them loosely. About one-half packed the vegetables fairly loosely, whereas about one-third packed them tightly. A greater percentage of those under 35 years of age than older incorrectly packed vegetables tightly.

Raw fruits and vegetables, other than raw peas, corn, and lima beans, can be packed into jars tightly because they will cook down or shrink during processing. About half the canners packed raw fruits and vegetables tightly.

Three-fourths of the canners used the hot pack procedure, by which fruits and vegetables are heated and then packed into hot jars. To avoid underprocessing, jars should be packed fairly loosely, as the food will not cook down during processing. Five out of 10 canners packed jars fairly loosely, whereas slightly more than 4 out of 10 incorrectly packed them tightly.

After raw or heated fruits or vegetables are packed into jars, the food should be covered with boiling liquid. About half the canners who used the raw pack procedure covered the food with boiling liquid. Four out of 10 incorrectly used cold or nonboiling liquid. As their age increased and their level of education decreased, canners were less likely to cover raw fruits and vegetables with boiling liquid. More than half of those using the hot pack correctly covered heated fruits and vegetables with boiling rather than nonboiling liquid.

Use of Pressure Saucepan.--When a pressure cooker (saucepan) is used, 20 minutes must be added to the processing time recommended for a particular food processed with the pressure canner. This is because pressure cookers heat and cool more rapidly than pressure canners do. Thus, additional time is needed to compensate for the otherwise reduced exposure of the food to heat.

Although all pressure-cooker users should have increased the processing time, few did so. Of the 8 percent who used the pressure cooker, 16 percent correctly used longer processing times, about 30 percent used the same processing times as for a pressure canner, and 8 percent used shorter times. Approximately 15 percent did not know how processing times used for the pressure cooker compared with times recommended for the pressure canner, and the remaining did not provide an answer.

Altitude Adjustments.--Although no information was obtained from the survey to assess the need to adjust for altitude in processing time or amount of pressure used in relation to the locality of the home canner, questions were asked to learn whether the type of adjustment, when made, was correct.

More than three-fourths of the 8 percent indicating an altitude adjustment when using the boiling-water-bath method made the correct adjustment by increasing the heating time over that required at sea level. Only 1 out of 10 made an incorrect adjustment for altitude by decreasing the heating time.

About half of the 7 percent who indicated an adjustment for altitude when using the pressure canner made the correct adjustment by increasing the pounds of pressure. One-third adjusted for altitude incorrectly by increasing the heating time when using the pressure canner.

Preparation and Storage of Home-Canned Fruits and Vegetables

Respondents were asked about the practices they followed in preparing and storing home-canned fruits and vegetables, including checking jars for sealing failures, preparing canned foods for serving, and length of storage. Checking jar seals the day after canning is important to prevent unsealed jars from being stored and possibly used later. Also, if the unsealed jar is discovered soon after canning, the food often can be saved.

Checking Jar Seals.--Almost all canners, or about 95 percent, checked jars the day after canning to see whether they were sealed. No marked differences were found among demographic characteristics of canners relative to checking jar seals. However, about half of those who checked seals found jars that did not seal properly, with a greater percentage of canners under 50 years of age.

Canners were more likely to use food immediately from jars that did not seal than to discard, recan, or freeze it, as shown here:

Action	Respondents (percent)[1]
Used immediately	60
Discarded	30
Recanned, starting as if food were fresh	26
Froze food	6

[1]Households canning fruits and vegetables, other than only jams and jellies, totaled 1,252. Components cannot be totaled to 100 percent because more than 1 response was possible.

Each of these alternatives could be appropriate depending on the number of jars that did not seal. For example, if a dozen or so jars were found to be unsealed, the food would need to be recanned, frozen, or discarded because this quantity would not likely be used immediately.

A greater percentage of canners 65 years and older discarded unsealed food, as did more canners in households with one or two members than five or more members. Canners who were not high school graduates rather than those

with more education tended to discard the food. As the educational level increased, canners tended to recan unsealed jars of food as if it were fresh.

A greater percentage of those under 65 years used unsealed jars of food immediately, as did more of those with at least 2 years' canning experience, more households with three or more members, and more of those who had completed high school or some college.

Preparing Canned Foods for Serving.--The Department recommends that home-canned vegetables be boiled for at least 10 minutes before serving as a safety precaution. Boiling this length of time should destroy botulinum toxin present in improperly canned food. Although 5 out of 10 households prepared canned vegetables in this way, 3 out of 10 only brought the vegetables to a boil before serving, and 2 out of 10 served them without any heating. Of those who served canned vegetables without heating, there was little difference among age groups, educational levels, or those with or without canning experience.

Length of Storage of Home-Canned Foods.--For optimum quality, home-canned foods should be used within 1 year. However, length of storage does not necessarily affect the safety of canned foods. Properly processed foods stored under recommended conditions should be safe to eat when stored longer than a year.

Most canners used the home-canned fruits and vegetables within the recommended storage time, as shown here:

Storage time	Respondents (percent)[1]
Less than 6 months	6
6 months to 1 year	63
More than 1 year	31

[1]Households canning totaled 1,346.

Based on the total number of canners, as their age increased, they were more likely to store home-canned foods longer than 1 year; however, when their educational level increased, they were apt to store for a shorter time. More canners who stored home-canned fruits and vegetables for more than 1 year tended to have annual incomes of less than $5,000 (app. table 6). As expected, proportionately more of those who stored home-canned foods for less than 6 months came from households with three or more members.

Spoilage of Home-Canned Foods

Canners were asked to identify signs of spoilage in home- or commercially canned foods from a list of descriptive terms to obtain some measure of their knowledge about safety in relation to canned foods. These results, as well as those on spoilage of their home-canned fruits and vegetables, are reported here.

Recognition of Spoilage Signs in Canned Foods.--Most home canners were aware of some of the spoilage signs in canned foods, including jams and jellies, as indicated by the following responses:

Sign	Respondents (percent)[1]
Bulging lid	90
Leakage	80
Mold	78
Off-odor	76
Off-color[2]	68
Spurting liquid when container is opened	54
Floating fruit or vegetable[2]	30

[1]Households canning totaled 1,346. Components cannot be totaled to 100 percent because more than 1 response was possible.
[2]Not necessarily an indication of food spoilage.

Although spoilage may cause color changes in canned foods, off-color may not necessarily be a sign of spoilage. For example, darkening of foods at the top of jars may be caused by oxidation from air in the jars. Overprocessing may cause discoloration of foods throughout the containers. Also, minerals from cooking utensils or from water in some localities may cause brown, black, and gray coloration of some foods. However, any canned food with an unusual color should be examined carefully before use for other spoilage signs.

Unlike most of the other signs listed, floating fruits or vegetables are not an indication of spoilage. They may float because the pack is too loose, some air remains in the tissues of the product after heating and processing, or, as with fruits, the sirup is too heavy.

Similar percentages of canners of all ages recognized spoilage signs of canned foods, except more of those under 35 than between 50 and 64 years recognized mold as a sign, and more of those over 50 than under 35 years indicated spurting liquid as a spoilage sign. As their educational level increased, canners were more likely to recognize spoilage signs.

When demographic characteristics of canners were classified according to their recognition of each specific spoilage sign, little difference was noted regarding employment, education, age, household size, and income (app. table 7).

Those who selected a floating fruit or vegetable as a spoilage sign tended to have less education than those who recognized other spoilage signs. Fewer of those who selected floating fruits or vegetables tended to be under 35 and more 50 years or older compared with those who recognized other signs.

The presence of botulinum toxin in canned foods is not always indicated by a visible sign; thus food may be spoiled when spoilage signs are not evident.

Two out of five home canners thought that canned foods could be spoiled without spoilage signs, and approximately the same number incorrectly thought that if foods were spoiled there would always be some spoilage sign. The other respondents answered that they did not know. As their age increased, canners tended incorrectly to think that there would always be some spoilage sign. But as their educational level increased, they were more apt to believe that canned foods could be spoiled without any visible sign.

Spoilage Reported by Home Canners.--About one-fourth of canners had one or more jars of home-canned fruits or vegetables spoil in 1975 (app. table 8). Of the 80 percent canning in both 1975 and 1974, about one-fourth had spoilage in 1974. Demographic characteristics were similar for those having spoilage in 1974, 1975, or both years. However, for those with spoilage in either or both years, more tended to be 50 years or older than under 35.

The proportion of households reporting spoilage of various products in 1975 was as follows:

Product	Households reporting spoilage (percent)[1]
Fruits	8
Tomatoes	18
Pickles	5
Tomato sauce	3
Low acid vegetables	11
Vegetable mixtures	7
Jams	2
Jellies	1

[1]Based on number canning each specific product.

Spoilage was reported most often for tomatoes and low acid vegetables by about 2 out of 10 and 1 out of 10 canners, respectively, who processed these products.

Although no information was obtained on the actual causes of spoilage, information given by respondents indicated that incorrect methods had been used in many cases. Even though the use of these methods resulting in inadequate processing could account for some spoilage, any one of several other factors could have caused spoilage, such as faulty lids, inaccurate pressure gages, insufficient processing time, overripe produce, and overpacked jars. The survey was conducted immediately following the period when faulty canning lids were inadvertently marketed. Lids from this supply could have been responsible for several sealing failures that later resulted in spoiled food.

Demographic characteristics of canners who had spoilage with the following acid and low acid foods are identified here where differences are large enough to be meaningful.

Fruits, Tomatoes, and Pickles.--Of households reporting spoilage of fruits, the open kettle and pressure canner were each used by 8 percent; however, a

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greater percentage used the open kettle than the pressure canner for this product (table 2). More canners who reported spoiled tomatoes tended to use the boiling-water bath or open kettle than the pressure canner. Spoiled pickles occurred in about the same percentage of households when either the boiling-water bath or open kettle was used, but more canners tended to use the latter method. Although the boiling-water bath was used by a number of canners with spoiled food, spoilage could not be definitely attributed to this method.

Table 2.--Methods most extensively used for processing various products and households reporting spoilage

Product	Method[1]	Households	
		Using method	Reporting spoilage[2]
		Percent	Percent
Fruits	Boiling-water bath	53	6
	Open kettle	44	8
	Pressure canner	16	8
Tomatoes	Boiling-water bath	52	18
	Open kettle	35	21
	Pressure canner	21	10
Pickles	Boiling-water bath	44	5
	Open kettle	57	5
Tomato sauce	Boiling-water bath	40	4
	Open kettle	43	2
	Pressure canner	18	2
Low acid vegetables	Boiling-water bath	40	13
	Open kettle	14	6
	Pressure canner	47	11
	Pressure cooker	10	5
Vegetable mixtures	Boiling-water bath	34	6
	Open kettle	26	6
	Pressure canner	38	9

[1]Open-kettle method results in inadequate processing for all products as does the boiling-water bath for low acid vegetables and vegetable mixtures.

[2]Based on canners who used each method for specific product and had at least 1 jar of spoiled product for a given method.

Proportionately more canners who used the pressure canner for processing fruits, tomatoes, and pickles in which spoilage later occurred were employed

than those using other methods (app. table 9); proportionately more of those using the boiling-water bath for pickles were not employed than those using the open kettle. Those using the latter method for the three products tended to be less educated than those using the boiling-water bath.

Of those who used the boiling-water bath for canning fruits and pickles that later spoiled, proportionately more were over 50 years of age than under 35; but similar percentages of those using this method for tomatoes that spoiled were from both age groups. Proportionately more of those using the open kettle for canning tomatoes and pickles that spoiled were older, whereas percentages of those in both age categories were similar for those who canned fruits that spoiled. More of those using the boiling-water-bath and open-kettle methods for canning fruits and pickles that later spoiled tended to have annual incomes of less than $5,000 than those with incomes of $20,000 and over; however, percentages of those in both income levels were similar for those canning pickles that spoiled after using the open-kettle method.

Tomato Sauce.--Percentages of households using the boiling-water-bath and open-kettle methods for canning tomato sauce were similar, but more canners reporting spoilage tended to use the boiling-water bath than the open kettle (table 2).

Use of the boiling-water bath may not have been the cause of spoilage, however, since actual causes were not determined. Such other factors as faulty lids could have been responsible. The percentage of those using the pressure canner was about half that of those using either of the other two methods; however, spoilage levels were the same as for the open-kettle method.

The oven method was used by less than 1 percent for canning tomato sauce, and no spoilage was reported by the 4 percent who used the pressure cooker (saucepan). The households that had used the various methods for this product and later had spoilage were too few to make conclusions about demographic characteristics (app. table 9).

Low Acid Vegetables and Vegetable Mixtures.--The pressure canner and boiling-water bath were the most frequently used processing methods for these products (table 2).

Spoilage occurred with all processing methods used for canning low acid vegetables but tended to be higher with the boiling-water bath and pressure canner, a reflection no doubt that substantially more households used these methods. The percentage of canners reporting spoilage of vegetable mixtures was similar for all three processing methods, although more tended to use the boiling-water bath and pressure canner than the open kettle.

Similar percentages of canners using the pressure canner and the boiling-water bath for low acid vegetables that later spoiled had not completed high school (app. table 9); slightly more of those using the pressure canner than the boiling-water bath had received some college education. Although only a small percentage of canners used the open-kettle method, they tended to have more education than those using the other methods. Proportionately more of those using the pressure canner for low acid vegetables and vegetable mixtures

and the boiling-water bath for vegetable mixtures that spoiled were under 35 than over 50 years of age.

Jams and Jellies.--The open-kettle method was used by about 85 percent of those who prepared either jams or jellies; 13 percent of the households processed jam by the boiling-water bath, which is not used for jellies. About 1 or 2 percent of the households preparing these products reported spoilage. The extent of spoilage was too small to make conclusions about demographic characteristics of canners, and data for these products are not included.

Equipment Used for Canning Foods That Later Spoiled.--Spoilage was higher in households in which standard home canning jars rather than nonstandard jars were used for fruits and vegetables, other than jams and jellies; however, a much greater percentage of canners used standard home canning jars than nonstandard ones, as shown in the following data:

Container	Households using container (percent)	Households reporting spoilage (percent)[1]
Standard home canning jars	94	23
Nonstandard jars	37	14

[1]Based on total number of households using each type of container.

A slightly higher percentage of those using nonstandard than standard jars for canning food that later spoiled were not employed (app. table 10). Education and age characteristics were similar for those using both types of jars. Similar percentages of households using both types of jars had incomes of less than $5,000; however, proportionately more of those who used nonstandard jars had incomes of $20,000 and over.

Spoilage occurred in about the same proportion of households canning fruits and vegetables, other than jams or jellies, whether new or reused flat metal lids were used (table 3). However, considerably more canners used new flat metal lids than those who reused lids. Also, in households using reused flat metal lids, most lids were likely to be new. Thus, the likelihood of spoilage in households using new lids was greater because the number of jars of food was substantially larger.

Proportionately more of the canners using new flat metal lids who reported spoilage were not employed than those using paraffin or reusing flat metal lids (app. table 10). More who used new flat metal lids and who reused flat metal lids tended to have annual incomes of less than $5,000 than $20,000 and over.

Table 3.--Households using various lids or tops and reporting spoilage

Lid or top	Households	
	Using lid or top	Reporting spoilage[1]
	Percent	Percent
New flat metal lid, metal band (2-piece)	90	23
Paraffin	13	5
Reused flat metal lid, metal band (2-piece)	9	24
Porcelain-lined zinc cap with rubber ring	8	16
Glass with rubber ring and wire bail	5	22
Glass with rubber ring and metal band	3	6
Plastic flat lid with metal band	2	8

[1]Based on households using each kind of lid.

More of those who reused flat metal lids and porcelain-lined zinc caps for canning products that later spoiled tended not to complete high school than those using new flat metal lids (fig. 4); fewer of those reusing flat metal lids than those using the other methods tended to have college training. A greater percentage of those who used porcelain-lined zinc caps were over 50 years of age than under 35; similar percentages of canners who used paraffin and those who reused flat metal lids were under 35 than older.

Idea as to Cause of Spoilage.--Two-thirds of the canners reporting spoilage of home-canned fruits and vegetables in 1975 had an idea as to the cause, although the specific cause was not determined in the survey. However, canners that thought they knew the cause of spoilage were similar in education, age, and income level to those who had no idea as to the cause (app. table 11). About three-fourths of those that indicated they had an idea of the cause thought food spoiled because lids did not seal. Reporting this cause was not unexpected because of the inadvertent marketing of faulty lids a year or two previous to the study. One-tenth of the canners expressing ideas for a cause thought processing time was too short. Other reasons, such as the wrong processing method, food packed too tightly into the jar, and food overripe when processed, were each given by 3 percent. Households selecting the three last causes were too few to make conclusions about demographic characteristics of canners.

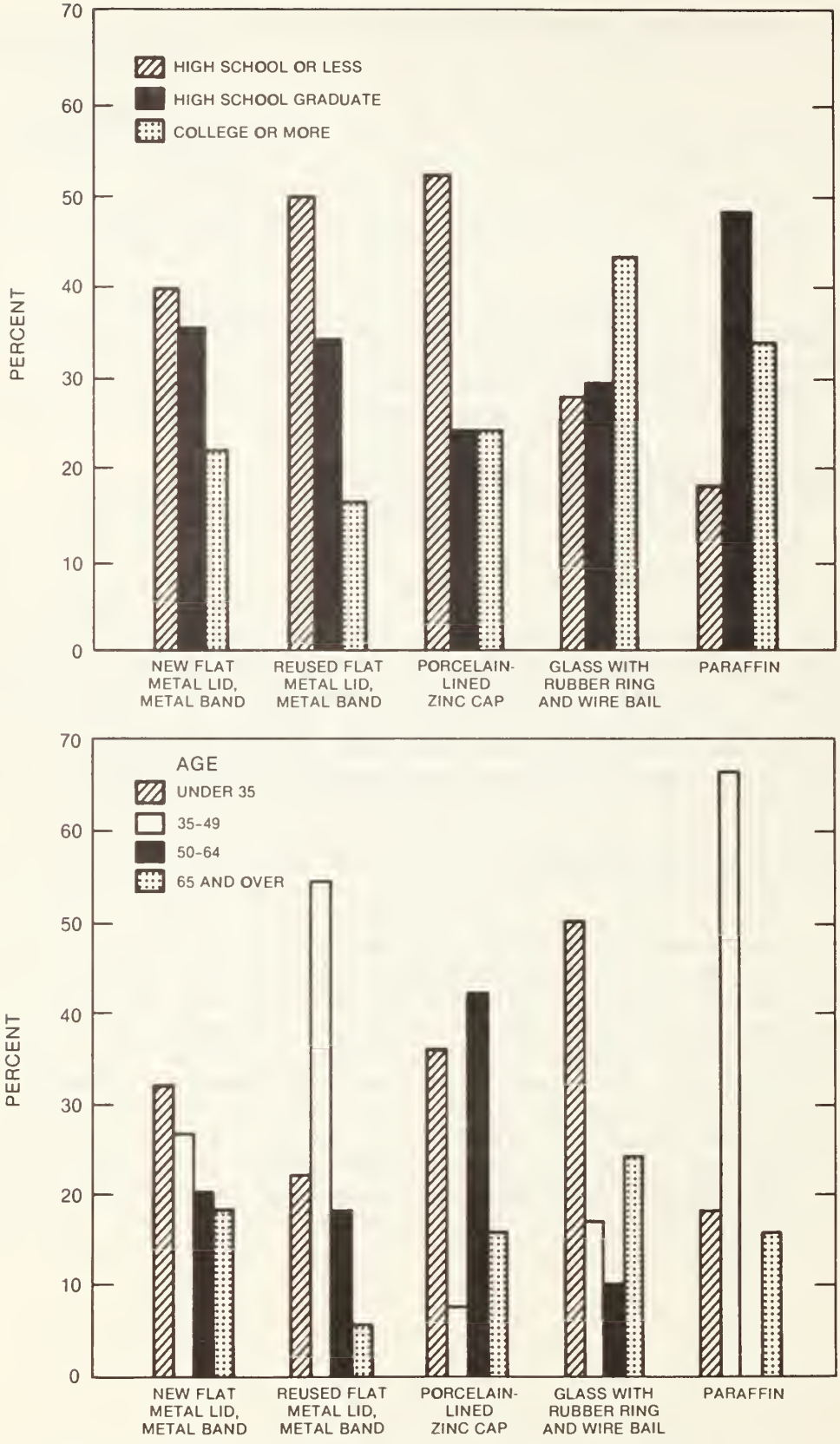

Figure 4.--Educational and age profiles of those who used specific lids or tops for canning foods that later spoiled.

Those who believed spoilage occurred because lids did not seal and because processing time was too short had similar educational training through high school. More of those attributing spoilage to lids tended to have some college education than those selecting the latter reason. More canners who associated spoilage with too short a processing time were under 35 years of age than over 50, whereas of those who thought failure of lids to seal was the probable cause of spoilage, more tended to be over 50 years than under 35.

Home Gardening and Incidence of Freezing by Home Canners

Canners were asked to supply information about their home gardens and the fruits and vegetables they froze in 1975 to determine whether there was a relationship between gardening and incidence of preserving food at home.

Fruits and Vegetables Grown.--Eighty percent of the households that canned fruits or vegetables at home in 1975 also had a fruit or vegetable garden in 1975. They were not asked which fruits or vegetables canned came from their gardens. However, a national survey of consumers' food-related behavior, attitudes, and motives, sponsored by the Department's Economics, Statistics, and Cooperatives Service (ESCS), reported that 46 percent of the households in the United States, excluding Alaska and Hawaii, had a fruit or vegetable garden in 1975.[5] According to the ESCS survey, about 14 percent of the respondents from the garden households indicated that the reason for having a garden was to provide food for canning. About 60 percent of the garden households also canned fruits or vegetables, and about 45 percent preserved some fruits or vegetables grown in the household garden.

Results of the canning survey indicated that similar percentages of canners of all ages had a household garden until age 65, when percentages of those with gardens tended to decline. Fewer of those employed than not employed tended to have a garden. A smaller percentage of households with one member than with three or more members had a garden. More households with incomes of $12,500 and over tended to have a garden than those with lower incomes.

As shown in table 4, tomatoes were grown by 96 percent of the canners with household gardens, beans and cucumbers by about three-fourths, and peppers, green onions (scallions), lettuce, radishes, other onions, and corn by about two-thirds. About half the households grew carrots, squash, beets, and peas, and one-fourth grew apples and strawberries. As was true for the ESCS study, the two most popular vegetables grown in 1975 home gardens--tomatoes and beans --were also the two vegetables most frequently canned, regardless of whether they came from a household garden.

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[5]Kaitz, E. Home gardening and incidence of freezing and canning. U.S. Dept. Agr. Family Econ. Rev., spring 1977: 3-6. 1977.

Table 4.--Selected fruits and vegetables grown and frozen in canning households, 1975[1]

Fruits and vegetables	Grown	Frozen
	Percent	Percent
Fruits:		
Apples	25	28
Strawberries	23	40
Melons	14	3
Peaches	14	26
Pears	11	6
Vegetables:		
Tomatoes	96	25
Beans (lima, green, wax, etc.)	83	57
Cucumbers	72	5
Peppers	68	34
Green onions	66	3
Lettuce	66	1
Radishes	64	1
Onions	62	4
Corn	59	55
Squash	54	27
Carrots	54	18
Beets	51	11
Peas	51	35
Turnips	30	8
Okra	27	19
Pumpkin	23	10
Spinach	19	8
Eggplant	16	4

[1]Households canning totaled 1,346, those with gardens 1,079, and those freezing fruits and vegetables 1,065. Fruits and vegetables frozen may not have come from a household garden.

Fruits and Vegetables Frozen.--About 80 percent of those who canned at home in 1975 also froze fruits and vegetables, whether or not they came from their own gardens. About half of these households froze beans and corn; peas, peppers, and strawberries were frozen by about one-third. According to the ESCS study, respondents in about 10 percent of the garden households stated that one reason for having a garden was to provide food for freezing. About 70 percent with home gardens also froze fruits or vegetables and about 60 percent froze some fruits or vegetables grown in their gardens.

Home Canning Supplies

In 1975, two-thirds of those who canned had difficulty in obtaining jars, lids, or other canning supplies. About 95 percent had some difficulty in locating jar lids and about 10 percent in finding jars, caps, or rubber rings. A greater percentage of those with spoilage both years than those without had difficulty in obtaining lids. Of those households that had difficulty in obtaining canning supplies, about 30 percent canned less fruits and vegetables than they had originally planned, about 25 percent froze some produce that they would have canned, and slightly more than 40 percent did not change their canning activities.

Home Canning Plans

About 85 percent of those canning in 1975 also planned to can in 1976, about 8 percent were unsure, and 5 percent did not plan to can (app. table 12). Those with incomes below $5,000 and those with incomes of $20,000 and over did not differ in 1976 home canning plans. Employment status was similar for those who planned to can and those who did not. Of those who planned to can in 1976, proportionately more canners were under 50 years of age, whereas more of those who did not plan to can were over 50. Those who planned to can tended to be better educated, as fewer had not completed high school and more had some college education, than those not planning to can.

Because of the extent of incorrect procedures reported in the survey, home canners need to be cautioned continuously to follow reliable instructions. If instructions, such as those found in USDA publications, are followed, the risk of spoilage that can result in economic loss from wasted food or in illness could be reduced.

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APPENDIX

The appendix tables include instruction sources, equipment, and methods used in home canning of fruits and vegetables as well as spoilage of these home-canned products. The data are cross-tabulated by the following demographic characteristics: Home canner's employment, education, age, household size, income level, and whether the canner has children (life cycle).

The appendix tables are as follows:

1 ----- Sources of home canning instructions

2 ----- Total amount of fruits and vegetables canned, excluding jams and jellies

3-4 --- Types of containers and lids used

5 ----- Methods used for canning fruits, tomatoes, pickles, tomato sauce, low acid vegetables, vegetable mixtures, jams, and jellies

6 ----- Length of storage of canned fruits and vegetables

7-11 -- Incidence of spoilage and ideas as to cause

12 ---- Home canning plans

The two exhibits are questionnaires used in the home canning survey.

Appendix table 1.--Sources of home canning instructions, 1975[1]

Respondent characteristic	USDA publications	Extension Service publications	Cookbooks	Magazines or newspapers	Friends or relatives	Personal recipe or experience	Manufacturer's cookbook
	Percent	Percent	Percent	Percent	Percent	Percent	Percent
U.S. total	9	11	43	12	61	10	10
Employment:							
Currently employed:							
Full time	18	21	25	25	26	14	10
Part time	26	23	19	20	19	19	23
Not employed	54	54	53	53	53	61	67
Education:							
Some high school or less	16	14	25	18	33	61	32
High school graduate	32	27	40	44	38	19	37
College or more or vocational training	52	59	34	39	28	17	29
Age:							
Under 35	31	31	33	35	38	5	29
35-49	31	32	34	31	28	15	26
50-64	20	21	21	25	20	40	30
65 and over	15	13	10	8	12	39	13
Household size:							
1	8	9	6	7	8	15	7
2	33	29	30	28	27	53	32
3 or 4	35	34	40	41	42	25	34
5 or more	24	28	24	24	23	6	25
Income level:							
Under $5,000	10	8	10	12	15	25	8
$5,000-$12,499	31	27	29	32	29	31	40
$12,500-$19,999	33	35	29	30	28	10	32
$20,000 and over	13	18	18	16	16	16	5
Life cycle:							
Children	55	60	58	60	59	23	51
No children	45	40	42	40	41	77	47

[1]Households canning totaled 1,346. Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

Appendix table 2.--Total amount of fruits and vegetables home canned, 1975[1]

Respondent characteristic	Less than 12 qts	12-24 qts	25-99 qts	100-199 qts	200 qts and over
	Percent	Percent	Percent	Percent	Percent
U.S. total	10	15	46	15	10
Employment:					
Currently employed:					
Full time	21	26	20	22	26
Part time	20	22	18	19	21
Not employed	58	50	60	56	49
Education:					
Some high school or less	38	26	38	32	38
High school graduate	36	38	34	46	37
College or more or vocational training	25	36	27	20	24
Age:					
Under 35	28	45	30	29	27
35-49	25	28	27	31	28
50-64	19	19	27	19	35
65 and over	25	8	15	20	10
Household size:					
1	15	12	10	1	5
2	30	22	34	32	29
3 or 4	42	44	39	38	33
5 or more	13	22	17	27	32
Income level:					
Under $5,000	17	10	15	16	13
$5,000-$12,499	28	29	32	25	41
$12,500-$19,999	24	26	27	29	23
$20,000 and over	17	20	16	10	10
Life cycle:					
Children	47	61	48	58	54
No children	53	39	52	41	46

[1]Households canning fruits and vegetables, other than only jams and jellies, totaled 1,252. Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

Appendix table 3.--Type of container used in home canning of fruits and vegetables, 1975[1]

Respondent characteristic	Standard home canning jar	Nonstandard jar
	Percent	Percent
U.S. total	94	37
Employment:		
Currently employed:		
Full time	23	23
Part time	20	19
Not employed	55	57
Education:		
Some high school or less	35	33
High school graduate	37	38
College or more or vocational training	27	28
Age:		
Under 35	32	33
35-49	28	30
50-64	24	21
65 and over	15	16
Household size:		
1	8	7
2	32	26
3 or 4	39	39
5 or more	21	28
Income level:		
Under $5,000	15	16
$5,000-$12,499	30	32
$12,500-$19,999	26	24
$20,000 and over	15	18
Life cycle:		
Children	52	59
No children	48	41

[1]Households canning fruits and vegetables, other than only jams and jellies, totaled 1,252. Less than 1 percent of households used tin cans. Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

Appendix table 4.--Type of lids or tops used in home canning of fruits and vegetables, 1975[1]

Respondent characteristic	New flat metal lid, metal band	Paraffin	Reused flat metal lid, metal band	Porcelain-lined zinc cap with rubber ring	Glass with rubber ring and wire bail	Glass with rubber ring and metal band
	Percent	Percent	Percent	Percent	Percent	Percent
U.S. total	90	13	9	8	5	3
Employment:						
Currently employed:						
Full time	22	22	21	14	36	3
Part time	19	16	26	16	16	23
Not employed	56	59	52	68	46	74
Education:						
Some high school or less	36	26	35	41	22	24
High school graduate	38	44	34	31	37	32
College or more or vocational training	26	29	31	28	38	36
Age:						
Under 35	31	21	36	25	32	25
35-49	28	32	34	30	19	29
50-64	25	28	18	20	24	16
65 and over	15	18	11	26	18	30
Household size:						
1	9	8	8	12	4	4
2	32	36	26	24	34	23
3 or 4	38	31	38	38	47	38
5 or more	21	25	29	26	15	35
Income level:						
Under $5,000	15	15	22	22	12	23
$5,000-$12,499	30	21	24	24	27	28
$12,500-$19,999	26	24	23	24	35	27
$20,000 and over	14	29	20	19	13	11
Life cycle:						
Children	52	48	61	59	43	54
No children	47	52	39	41	57	46

[1]Households canning fruits and vegetables, other than only jams and jellies, and using jars totaled 1,216. About 2 percent of households used plastic flat lids with metal bands, 4 percent used other types, and none used plastic film. Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

Appendix table 5.--Home canning methods used for fruits and vegetables, including jams and jellies, 1975[1]

Respondent characteristic	Boiling-water bath	Pressure cooker (saucepan)	Pressure canner	Open kettle
	Percent	Percent	Percent	Percent
		Fruits[2]		
U.S. total	53	4	16	44
Employment:				
Currently employed:				
Full time	24	24	26	19
Part time	22	14	16	15
Not employed	52	62	55	66
Education:				
Some high school or less	24	28	38	47
High school graduate	38	40	35	29
College or more or vocational training	37	33	27	23
Age:				
Under 35	35	49	32	23
35-49	31	19	28	24
50-64	21	21	16	26
65 and over	12	11	20	25
Household size:				
1	7	6	8	11
2	27	22	37	35
3 or 4	38	43	35	34
5 or more	29	30	20	20
Income level:				
Under $5,000	12	12	18	23
$5,000-$12,499	31	46	36	30
$12,500-$19,999	30	18	23	18
$20,000 and over	14	20	15	16
Life cycle:				
Children	60	57	50	43
No children	40	43	50	56

[1]Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

[2]Households canning fruits totaled 751. Less than 1 percent of households used oven method.

Appendix table 5.--Home canning methods used for fruits and vegetables, including jams and jellies, 1975[1]--Continued

Respondent characteristic	Boiling-water bath	Pressure cooker (saucepan)	Pressure canner	Open kettle
	Percent	Percent	Percent	Percent
		Tomatoes[3]		
U.S. total	52	4	21	35
Employment:				
Currently employed:				
Full time	24	16	23	20
Part time	19	16	16	20
Not employed	54	59	57	58
Education:				
Some high school or less	28	35	40	41
High school graduate	40	27	39	42
College or more or vocational training	31	34	20	17
Age:				
Under 35	33	31	32	26
35-49	33	28	24	24
50-64	22	17	25	27
65 and over	10	24	15	22
Household size:				
1	6	12	7	9
2	24	39	43	34
3 or 4	45	24	30	42
5 or more	24	25	20	15
Income level:				
Under $5,000	12	6	14	18
$5,000-$12,499	26	32	34	31
$12,500-$19,999	32	27	26	23
$20,000 and over	14	27	12	17
Life cycle:				
Children	60	46	47	46
No children	39	54	53	54

[1]Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

[3]Households canning tomatoes totaled 987. Less than 1 percent of households used oven method.

Appendix table 5.--Home canning methods used for fruits and vegetables, including jams and jellies, 1975[1]--Continued

Respondent characteristic	Boiling-water bath	Pressure cooker (saucepan)	Pressure canner	Open kettle
	Percent	Percent	Percent	Percent
			Pickles[4]	
U.S. total	44	---	4	57
Employment:				
Currently employed:				
Full time	27	---	24	22
Part time	22	---	13	20
Not employed	46	---	63	56
Education:				
Some high school or less	28	---	16	40
High school graduate	36	---	48	39
College or more or vocational training	34	---	31	21
Age:				
Under 35	40	---	48	20
35-49	32	---	28	29
50-64	18	---	0	32
65 and over	8	---	17	19
Household size:				
1	2	---	7	9
2	28	---	44	33
3 or 4	45	---	28	35
5 or more	26	---	21	23
Income level:				
Under $5,000	13	---	26	16
$5,000-$12,499	25	---	22	35
$12,500-$19,999	29	---	11	23
$20,000 and over	18	---	30	14
Life cycle:				
Children	60	---	67	50
No children	40	---	33	50

[1]Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

[4]Households canning pickles totaled 640. Oven method not used and less than 2 percent of households used pressure cooker.

Appendix table 5.--Home canning methods used for fruits and vegetables, including jams and jellies, 1975[1]--Continued

Respondent characteristic	Boiling-water bath	Pressure cooker (saucepan)	Pressure canner	Open kettle
	Percent	Percent	Percent	Percent
			Tomato sauce[5]	
U.S. total	40	4	18	43
Employment:				
Currently employed:				
Full time	21	9	28	22
Part time	24	20	13	23
Not employed	54	71	59	56
Education:				
Some high school or less	17	17	35	35
High school graduate	34	30	36	48
College or more or vocational training	48	53	29	16
Age:				
Under 35	40	21	39	20
35-49	30	29	26	24
50-64	20	36	24	38
65 and over	10	14	11	16
Household size:				
1	6	14	0	10
2	15	28	37	40
3 or 4	53	9	32	30
5 or more	26	50	30	20
Income level:				
Under $5,000	17	31	25	13
$5,000-$12,499	17	32	19	35
$12,500-$19,999	27	17	23	20
$20,000 and over	22	21	21	19
Life cycle:				
Children	72	60	55	42
No children	28	40	45	58

[1]Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

[5]Households canning tomato sauce totaled 275. Less than 1 percent of households used oven method.

Appendix table 5.--Home canning methods used for fruits and vegetables, including jams and jellies, 1975[1]--Continued

Respondent characteristic	Boiling-water bath	Pressure cooker (saucepan)	Pressure canner	Open kettle
	Percent	Percent	Percent	Percent
		Low acid vegetables[6]		
U.S. total	40	10	47	14
Employment:				
Currently employed:				
Full time	30	19	22	21
Part time	20	17	20	15
Not employed	46	64	56	63
Education:				
Some high school or less	36	40	37	41
High school graduate	41	33	37	26
College or more or vocational training	21	27	25	30
Age:				
Under 35	35	35	33	29
35-49	26	25	27	34
50-64	24	24	23	18
65 and over	13	16	16	19
Household size:				
1	8	13	7	6
2	23	33	35	25
3 or 4	41	28	35	42
5 or more	27	26	23	28
Income level:				
Under $5,000	12	19	16	21
$5,000-$12,499	31	29	30	31
$12,500-$19,999	31	28	24	14
$20,000 and over	11	20	16	24
Life cycle:				
Children	62	45	53	63
No children	37	55	47	37

[1]Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

[6]Households canning low acid vegetables totaled 689. Less than 1 percent of households used oven method.

Appendix table 5.--Home canning methods used for fruits and vegetables, including jams and jellies, 1975[1]--Continued

Respondent characteristic	Boiling-water bath	Pressure cooker (saucepan)	Pressure canner	Open kettle
	Percent	Percent	Percent	Percent
		Vegetable mixtures[7]		
U.S. total	34	5	38	26
Employment:				
Currently employed:				
Full time	24	19	20	20
Part time	18	8	19	17
Not employed	55	73	56	63
Education:				
Some high school or less	40	51	40	42
High school graduate	35	26	42	32
College or more or vocational training	21	23	18	21
Age:				
Under 35	30	28	38	16
35-49	26	32	23	29
50-64	32	8	23	37
65 and over	12	31	12	19
Household size:				
1	8	31	7	6
2	26	0	34	43
3 or 4	48	27	38	33
5 or more	18	42	21	18
Income level:				
Under $5,000	16	18	14	25
$5,000-$12,499	30	41	37	20
$12,500-$19,999	25	41	28	32
$20,000 and over	15	0	11	14
Life cycle:				
Children	55	60	57	34
No children	45	40	43	66

[1]Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

[7]Households canning vegetable mixtures totaled 246. Less than 1 percent of households used oven method.

Appendix table 5.--Home canning methods used for fruits and vegetables, including jams and jellies, 1975[1]--Continued

Respondent characteristic	Boiling-water bath	Pressure cooker (saucepan)	Pressure canner	Open kettle
	Percent	Percent	Percent	Percent
			Jams[8]	
U.S. total	13	2	2	85
Employment:				
Currently employed:				
Full time	21	26	35	22
Part time	24	0	0	21
Not employed	54	74	65	56
Education:				
Some high school or less	28	12	12	30
High school graduate	26	65	26	39
College or more or vocational training	43	23	62	31
Age:				
Under 35	46	77	57	26
35-49	30	0	16	31
50-64	10	11	0	27
65 and over	14	12	27	15
Household size:				
1	5	0	0	7
2	28	22	46	32
3 or 4	44	58	28	34
5 or more	24	20	26	27
Income level:				
Under $5,000	15	32	38	15
$5,000-$12,499	18	19	0	29
$12,500-$19,999	31	11	16	26
$20,000 and over	11	37	46	17
Life cycle:				
Children	64	67	54	55
No children	36	33	46	45

[1]Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

[8]Households canning jams totaled 551. Less than 1 percent of households used oven method.

Appendix table 5.--Home canning methods used for fruits and vegetables, including jams and jellies, 1975[1]--Continued

Respondent characteristic	Boiling-water bath	Pressure cooker (saucepan)	Pressure canner	Open kettle
	Percent	Percent	Percent	Percent
		Jellies[9]		
U.S. total	10	3	2	87
Employment:				
Currently employed:				
Full time	23	7	35	21
Part time	17	20	0	21
Not employed	60	73	65	56
Education:				
Some high school or less	41	28	28	37
High school graduate	24	50	18	40
College or more or vocational training	30	22	54	23
Age:				
Under 35	34	65	39	23
35-49	22	12	30	28
50-64	25	7	12	31
65 and over	20	15	19	17
Household size:				
1	7	0	0	8
2	26	29	63	33
3 or 4	57	28	19	34
5 or more	10	43	18	25
Income level:				
Under $5,000	5	28	46	16
$5,000-$12,499	25	32	0	32
$12,500-$19,999	28	25	11	24
$20,000 and over	15	15	32	16
Life cycle:				
Children	62	64	45	50
No children	38	36	55	50

[1]Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

[9]Households canning jellies totaled 546. Less than 1 percent of households used oven method.

Appendix table 6.--Length of storage of home-canned fruits and vegetables, 1975[1]

Respondent characteristic	Less than 6 months	6 months to 1 year	More than 1 year
	Percent	Percent	Percent
U.S. total	6	63	31
Employment:			
Currently employed:			
Full time	17	23	21
Part time	26	21	14
Not employed	57	54	61
Education:			
Some high school or less	40	32	43
High school graduate	27	38	34
College or more or vocational training	32	30	22
Age:			
Under 35	40	32	24
35-49	25	31	23
50-64	25	23	28
65 and over	10	12	23
Household size:			
1	3	7	13
2	17	32	34
3 or 4	58	39	33
5 or more	21	22	20
Income level:			
Under $5,000	13	12	20
$5,000-$12,499	28	30	31
$12,500-$19,999	32	29	21
$20,000 and over	15	16	13
Life cycle:			
Children	72	55	44
No children	28	45	56

[1]Canning households totaled 1,346. Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

Appendix table 7.--Recognition of spoilage signs in canned food by home canners, 1975[1]

Respondent characteristic	Bulging lid	Leakage	Mold	Off-odor	Off-color	Floating fruit or vegetable	Spurting liquid when container opened
	Percent	Percent	Percent	Percent	Percent	Percent	Percent
U.S. total	90	80	78	76	68	30	54
Employment:							
Currently employed:							
Full time	22	22	22	23	23	22	22
Part time	19	20	19	19	19	18	18
Not employed	56	55	57	56	56	56	56
Education:							
Some high school or less	34	32	33	31	34	39	35
High school graduate	37	36	36	37	37	35	35
College or more or vocational training	28	30	30	31	28	25	28
Age:							
Under 35	29	31	32	33	32	21	25
35-49	29	30	29	29	29	32	28
50-64	25	24	22	22	22	25	28
65 and over	15	14	16	14	15	20	18
Household size:							
1	9	9	9	8	8	11	10
2	31	30	30	29	29	36	35
3 or 4	39	39	39	40	41	33	36
5 or more	21	22	22	23	22	20	20
Income level:							
Under $5,000	15	14	14	14	15	19	18
$5,000-$12,499	29	29	30	29	29	27	29
$12,500-$19,999	28	28	28	29	29	27	27
$20,000 and over	15	16	14	15	15	14	13
Life cycle:							
Children	52	54	55	56	55	46	48
No children	48	46	45	44	45	54	52

[1]Canning households totaled 1,346. Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

Appendix table 8.--Spoilage reported in home-canned fruits and vegetables, 1974 and 1975[1]

Respondent characteristic	1974	1975	1974 and 1975
	Percent	Percent	Percent
U.S. total	24	23	15
Employment:			
Currently employed:			
Full time	25	22	27
Part time	24	23	29
Not employed	50	52	43
Education:			
Some high school or less	37	40	42
High school graduate	34	37	35
College or more or vocational training	29	21	23
Age:			
Under 35	33	32	29
35-49	29	27	31
50-64	23	20	24
65 and over	14	17	14
Household size:			
1	6	8	6
2	27	29	29
3 or 4	38	42	37
5 or more	29	22	28
Income level:			
Under $5,000	16	18	17
$5,000-$12,499	32	33	32
$12,500-$19,999	26	29	24
$20,000 and over	14	12	15
Life cycle:			
Children	61	54	56
No children	39	46	44

[1]Households canning totaled 1,077 in 1974, 1,346 in 1975, and 1,077 in both 1974 and 1975. Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

Appendix table 9.--Selected home canning methods used for fruits and vegetables that spoiled, 1975[1]

Respondent characteristic	Boiling-water bath	Pressure canner	Open kettle
	Percent	Percent	Percent
		Fruits[2]	
Used each method	53	16	44
Reported spoilage	6	8	8
Employment:			
Currently employed:			
Full time	5	0	10
Part time	29	63	26
Not employed	65	37	59
Education:			
Some high school or less	28	34	41
High school graduate	20	33	43
College or more or vocational training	52	33	16
Age:			
Under 35	30	53	45
35-49	11	0	9
50-64	28	11	24
65 and over	26	37	22
Household size:			
1	10	0	15
2	42	25	22
3 or 4	19	64	27
5 or more	30	11	36
Income level:			
Under $5,000	29	12	19
$5,000-$12,499	38	20	59
$12,500-$19,999	29	24	14
$20,000 and over	0	33	5
Life cycle:			
Children	44	63	54
No children	56	37	46

[1]Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

[2]Households canning fruits totaled 751. Less than 1 percent of households used oven method and only about 4 percent used pressure cooker.

Appendix table 9.--Selected home canning methods used for fruits and vegetables that spoiled, 1975[1]--Continued

Respondent characteristic	Boiling-water bath	Pressure canner	Open kettle
	Percent	Percent	Percent
		Tomatoes[3]	
Used each method	52	21	35
Reported spoilage	18	10	21
Employment:			
Currently employed:			
Full time	30	12	20
Part time	16	49	21
Not employed	51	38	56
Education:			
Some high school or less	37	44	48
High school graduate	40	33	35
College or more or vocational training	23	23	14
Age:			
Under 35	32	33	30
35-49	34	16	21
50-64	21	27	27
65 and over	12	14	22
Household size:			
1	5	0	13
2	25	56	29
3 or 4	47	32	43
5 or more	22	13	15
Income level:			
Under $5,000	15	31	23
$5,000-$12,499	28	33	33
$12,500-$19,999	35	26	20
$20,000 and over	11	10	16
Life cycle:			
Children	58	44	45
No children	42	56	55

[1]Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

[3]Households canning tomatoes totaled 987. Less than 1 percent of households used oven method and only about 4 percent used pressure cooker.

Appendix table 9.--Selected home canning methods used for fruits and vegetables that spoiled, 1975[1]--Continued

Respondent characteristic	Boiling-water bath	Pressure canner	Open kettle
	Percent	Percent	Percent
		Pickles[4]	
Used each method	44	4	57
Reported spoilage	5	4	5
Employment:			
Currently employed:			
Full time	18	0	24
Part time	17	100	31
Not employed	65	0	44
Education:			
Some high school or less	49	100	45
High school graduate	23	0	41
College or more or vocational training	29	0	14
Age:			
Under 35	16	100	10
35-49	9	0	32
50-64	55	0	18
65 and over	20	0	39
Household size:			
1	0	0	15
2	48	0	32
3 or 4	34	100	35
5 or more	18	0	18
Income level:			
Under $5,000	31	0	20
$5,000-$12,499	36	100	27
$12,500-$19,999	17	0	19
$20,000 and over	0	0	23
Life cycle:			
Children	26	100	28
No children	74	0	72

[1]Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

[4]Households canning pickles totaled 640. Oven method was not used and less than 2 percent used pressure cooker.

Appendix table 9.--Selected home canning methods used for fruits and vegetables that spoiled, 1975[1]--Continued

Respondent characteristic	Boiling-water bath	Pressure canner	Open kettle
	Percent	Percent	Percent
		Tomato sauce[5]	
Used each method	40	18	43
Reported spoilage	4	2	2
Employment:			
Currently employed:			
Full time	0	0	0
Part time	0	100	50
Not employed	56	0	50
Education:			
Some high school or less	0	0	50
High school graduate	44	0	50
College or more or vocational training	56	100	0
Age:			
Under 35	0	100	0
35-49	44	0	50
50-64	0	0	50
65 and over	56	0	0
Household size:			
1	0	0	0
2	0	0	0
3 or 4	56	100	50
5 or more	44	0	50
Income level:			
Under $5,000	56	0	0
$5,000-$12,499	0	100	0
$12,500-$19,999	0	0	0
$20,000 and over	0	0	0
Life cycle:			
Children	44	100	50
No children	56	0	50

[1]Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

[5]Households canning tomato sauce totaled 275. Less than 1 percent of households used oven method and only about 4 percent used pressure cooker.

Appendix table 9.--Selected home canning methods used for fruits and vegetables that spoiled, 1975[1]--Continued

Respondent characteristic	Boiling-water bath	Pressure canner	Open kettle
	Percent	Percent	Percent
		Low acid vegetables[6]	
Used each method	40	47	14
Reported spoilage	13	11	6
Employment:			
Currently employed:			
Full time	30	11	54
Part time	16	33	23
Not employed	51	51	23
Education:			
Some high school or less	46	42	0
High school graduate	31	23	54
College or more or vocational training	20	30	46
Age:			
Under 35	28	45	23
35-49	29	26	54
50-64	25	10	0
65 and over	14	14	23
Household size:			
1	12	0	0
2	20	30	23
3 or 4	38	44	54
5 or more	30	26	23
Income level:			
Under $5,000	10	8	23
$5,000-$12,499	37	35	0
$12,500-$19,999	43	50	54
$20,000 and over	3	8	0
Life cycle:			
Children	65	64	77
No children	35	36	23

[1]Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

[6]Households canning low acid vegetables totaled 689. Less than 1 percent of households used oven method and about 10 percent used pressure cooker.

Appendix table 9.--Selected home canning methods used for fruits and vegetables that spoiled, 1975[1]--Continued

Respondent characteristic	Boiling-water bath	Pressure canner	Open kettle
	Percent	Percent	Percent
		Vegetable mixtures[7]	
Used each method	34	38	26
Reported spoilage	6	9	6
Employment:			
Currently employed:			
Full time	0	18	65
Part time	44	20	0
Not employed	56	44	35
Education:			
Some high school or less	100	18	0
High school graduate	0	82	64
College or more or vocational training	0	0	36
Age:			
Under 35	32	38	28
35-49	44	32	35
50-64	0	12	36
65 and over	23	0	0
Household size:			
1	0	0	0
2	23	56	0
3 or 4	44	12	36
5 or more	32	32	64
Income level:			
Under $5,000	44	0	0
$5,000-$12,499	0	0	28
$12,500-$19,999	32	69	72
$20,000 and over	0	20	0
Life cycle:			
Children	77	52	64
No children	23	48	36

[1]Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

[7]Households canning vegetable mixtures totaled 246. Less than 1 percent of households used oven method and only about 5 percent used pressure cooker.

Appendix table 10.--Type of containers and lids or tops used in home canning of fruits and vegetables that spoiled, 1975[1]

Respondent characteristic	Containers[2]		Lids or tops[3]				
	Standard home canning jar	Non-standard jar	New flat metal lid, metal band	Paraffin	Reused flat metal lid, metal band	Porcelain-lined zinc cap with rubber ring	Glass with rubber ring and wire bail
	Percent	Percent	Percent	Percent	Percent	Percent	Percent
U.S. total	94	37	90	13	9	8	5
Reported spoilage	23	14	23	5	24	16	22
Employment:							
Currently employed:							
Full time	23	26	22	48	26	7	39
Part time	25	18	24	18	34	33	10
Not employed	49	54	51	34	34	61	52
Education:							
Some high school or less	41	34	40	18	50	52	28
High school graduate	35	38	36	48	34	24	29
College or more or vocational training	22	24	22	34	16	24	43
Age:							
Under 35	31	34	32	18	22	36	50
35-49	28	29	26	66	54	7	17
50-64	22	22	20	0	18	42	10
65 and over	16	14	18	16	6	16	24
Household size:							
1	7	8	7	0	5	9	0
2	29	23	30	16	18	30	18
3 or 4	43	39	41	66	53	46	61
5 or more	21	31	22	18	25	15	21
Income level:							
Under $5,000	16	17	16	0	23	18	33
$5,000-$12,499	35	22	35	34	23	31	0
$12,500-$19,999	30	28	31	0	26	36	39
$20,000 and over	11	22	11	48	19	0	0
Life cycle:							
Children	53	61	54	84	72	54	50
No children	47	39	46	16	28	46	50

[1]Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

[2]Canners having spoilage totaled 310. Less than 1 percent of households used tin cans.

[3]Canners having spoilage, excluding those using tin cans, totaled 301. About 2 percent of households used plastic flat lids with metal bands and about 3 percent used glass lids with rubber rings and metal bands.

Appendix table 11.--Home canners having idea as to cause of spoilage of home-canned fruits and vegetables and their reasons, 1975[1]

Respondent characteristic	Canners having idea as to cause of spoilage[2]		Reasons for spoilage[3]				
	Yes	No	Lids did not seal	Food overripe	Food processed too short a time	Wrong processing method used	Food packed too tightly in jar
	Percent	Percent	Percent	Percent	Percent	Percent	Percent
U.S. total	67	27	74	3	10	3	3
Employment:							
Currently employed:							
Full time	25	15	20	49	52	31	75
Part time	22	25	24	0	16	25	25
Not employed	50	57	55	51	24	44	0
Education:							
Some high school or less	39	39	39	63	41	0	0
High school graduate	37	38	33	19	33	56	49
College or more or vocational training	22	20	26	18	18	44	51
Age:							
Under 35	32	35	31	18	47	23	25
35-49	25	29	23	49	25	31	75
50-64	22	15	24	33	16	25	0
65 and over	17	18	19	0	5	22	0
Household size:							
1	8	5	8	0	6	22	0
2	32	22	34	33	16	0	0
3 or 4	40	45	40	67	26	78	49
5 or more	20	28	17	0	52	0	51
Income level:							
Under $5,000	17	19	15	33	18	22	26
$5,000-$12,499	30	39	32	30	21	0	0
$12,500-$19,999	30	29	29	18	56	54	25
$20,000 and over	11	10	12	0	6	0	24
Life cycle:							
Children	53	56	50	37	77	54	100
No children	47	44	50	63	23	46	0

[1]Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

[2]Canners having idea as to cause of spoilage totaled 310.

[3]Canners having reasons for spoilage totaled 209.

Appendix table 12.--Home canning plans, 1976[1]

Respondent characteristic	Plan to can	Do not plan to can	Not sure
	Percent	Percent	Percent
U.S. total	85	5	8
Employment:			
Currently employed:			
Full time	23	20	21
Part time	19	20	25
Not employed	57	60	49
Education:			
Some high school or less	34	47	33
High school graduate	37	30	40
College or more or vocational training	28	23	24
Age:			
Under 35	31	32	27
35-49	29	14	36
50-64	25	29	14
65 and over	14	24	22
Household size:			
1	7	24	14
2	32	26	24
3 or 4	39	37	37
5 or more	22	13	22
Income level:			
Under $5,000	13	19	21
$5,000-$12,499	30	33	23
$12,500-$19,999	28	19	23
$20,000 and over	14	14	20
Life cycle:			
Children	53	49	55
No children	47	51	42

[1]Canning households totaled 1,346. Components may not total 100 percent because all respondents did not furnish all information and because of rounding.

EXHIBIT 1

Response Analysis Corporation
Princeton, New Jersey 08540

OMB No. 40-S-76011
Expires June 1977
RAC 3849

LOCATION # _____ *105-09*

HOUSING UNIT # _____ *110-11*

NATIONAL SURVEY OF HOME CANNING

Response Analysis Corporation of Princeton, New Jersey, is conducting this survey for the U.S. Department of Agriculture.

The questionnaire is short and easy to fill out. It will take about ten minutes. We just want some information on your home canning.

Most of the questions can be answered by drawing a circle around the number next to the answer that best describes what you did.

For example:

Where do you keep your home-canned foods?

1 On a kitchen shelf (2) In a basement storage area

The questionnaire should be completed by the person who does most of the canning in your household. All answers will be confidential and will be used only to group together the same answers from everyone in the survey.

Please complete the questionnaire while our interviewer waits. If this is not convenient, our interviewer will return at your convenience to pick up the completed questionnaire.

If you have any questions about the survey, please call me collect at (609) 921-3333.

Sincerely,

James H. Fouss
Vice President

HOME CANNING QUESTIONNAIRE

Reports received by the U.S. Department of Agriculture during 1975 indicated that many people canning food at home had questions about canning or problems with canning. In order to provide the most effective help to the home canner in the future, the Department needs to get a clear picture of the home-canning situation. For this reason you (and hundreds of other home canners) are being asked to answer questions about the canning you do. The information you provide will also help the Department determine if additional research on home canning is needed to provide more information about canning in its consumer publications on canning food at home.

1. Where did you get the home-canning instructions you used in 1975?

(Circle as many numbers as apply)

1 U.S. Dept. of Agriculture publications
2 Extension Service publications
3 Cookbooks *112*
4 Magazines or newspapers
5 Friends or relatives
6 Other (Please write in): _____

2. Which of the following home-canning methods did you use for canning fruits or vegetables in 1975?

(Circle as many numbers as apply)

1 Boiling-water bath (food is packed hot or cold into the jars or cans and the filled jars or cans are heated in boiling water without pressure)
2 Pressure cooker (saucepan) (smaller than pressure canner, holds only half-pint or pint jars) *113*
3 Pressure canner (larger than pressure cooker, holds pint or quart jars, or #2 or #2½ cans)
4 Oven
5 Open-kettle (food is cooked in an uncovered pan, then packed in hot jars or cans and sealed without further heating)

Please go on to the next page.

3. Which of the foods listed below did you can or preserve in 1975 by each of the home-canning methods you used? (Circle the appropriate numbers)

	Boiling-water bath	Pressure cooker (saucepan)	Pressure canner	Oven	Open-kettle	
a. Fruits	1	2	3	4	5	*114*
b. Tomatoes	1	2	3	4	5	
c. Tomato sauce	1	2	3	4	5	
d. Other vegetables	1	2	3	4	5	
e. Vegetable mixtures	1	2	3	4	5	*118*
f. Pickles	1	2	3	4	5	
g. Jams	1	2	3	4	5	
h. Jellies	1	2	3	4	5	*121*

IF JAMS AND JELLIES WERE THE ONLY FOOD PRODUCTS YOU CANNED, PLEASE SKIP TO QUESTION 23.

PLEASE ANSWER QUESTIONS 4 AND 5 IF YOU USED A BOILING-WATER BATH FOR ANY OF YOUR CANNING.

4. Did you make an adjustment for altitude in the heating time compared to the times recommended for sea level?

(Circle one number)

1 Yes, made an adjustment
2 No, did not make an adjustment
3 Adjustment not necessary
4 Don't know recommended heating time for sea level

Please skip to Question 6 *122*

5. What type of adjustment did you make? (Circle one number)

1 Increased the heating time
2 Decreased the heating time *123*

PLEASE ANSWER QUESTION 6 IF YOU USED A PRESSURE COOKER (SAUCEPAN) FOR ANY OF YOUR CANNING.

6. How did the heating times you used for your pressure cooker (saucepan) compare to those recommended for a pressure canner? (Circle one number)

1 Used same heating times
2 Used longer heating times
3 Used shorter heating times
4 Don't know *124*

PLEASE ANSWER QUESTIONS 7 AND 8 IF YOU USED A PRESSURE CANNER FOR ANY OF YOUR CANNING.

7. Did you make an adjustment for altitude in either the pounds of pressure used or the heating times used compared to those recommended for sea level?

(Circle one number)

1 Yes, made an adjustment
2 No, did not make an adjustment
3 Adjustment not necessary
4 Don't know those recommended for sea level

125

Please skip to Question 9

8. What type of adjustment did you make? (Circle one number)

1 Increased the heating times
2 Decreased the heating times
3 Increased the pounds of pressure
4 Decreased the pounds of pressure

126

9. About how many jars or cans of fruits and vegetables did you can in 1975, other than jams or jellies?

(Write in approximate number of jars or cans in the box next to each container size used)

	Number of jars	
Half pint	☐	*127-28*
Pint	☐	
One and one-half pints	☐	*131-32*
Quart	☐	
Two-quart (half gallon)	☐	*135-36*
	Number of cans	
Number 2 can (about 2 1/2 cups)	☐	*137-38*
Number 2 1/2 can (about 3 1/2 cups)	☐	*139-40*
Other (Please write in sizes used)	Number	
_____	☐	*141-43*
_____	☐	*144-46*

10. What kind(s) of jars or cans did you use for home-canning fruits and vegetables, other than jams or jellies?

(Circle as many numbers as apply)

1 Tin cans designed for home canning ⟶ Please skip to Question 12 if only tin cans were used.
2 Jars designed for home canning
3 Other jars, such as peanut butter, coffee, salad dressing

147

11. What kind(s) of jar lids or tops did you use for canning fruits and vegetables other than jams or jellies?

(Circle as many numbers as apply)

1 New flat metal lid, metal band (two-piece)
2 Reused flat metal lid, metal band (two-piece)
3 Porcelain-lined zinc cap with rubber ring
4 Glass with rubber ring and wire bail
5 Glass with rubber ring and metal band
6 Plastic flat lid with metal band
7 Plastic film *148-49*
8 Paraffin
9 Other (Please write in): _____

_____

12. Did you fill any of your jars or cans with raw fruits and vegetables in preparing them for canning? (This is called the raw or cold pack method.) (Circle one number)

1 Yes *150*
2 No → Please skip to Question 16

PLEASE ANSWER QUESTION 13 IF YOU CANNED RAW PEAS, CORN OR LIMA BEANS BY THE RAW PACK METHOD.

13. How did you pack the raw peas, corn or lima beans into the jars or cans when you used the raw pack method? (Circle one number)

1 Tightly
2 Fairly loosely
3 Loosely

PLEASE ANSWER QUESTION 14 IF YOU CANNED RAW FRUITS OR VEGETABLES OTHER THAN PEAS, CORN OR LIMA BEANS BY THE RAW PACK METHOD.

14. How did you pack the raw fruits and vegetables (other than raw peas, corn or lima beans) into the jars or cans when you used the raw pack method? (Circle one number)

1 Tightly
2 Fairly loosely *152*
3 Loosely

15. How did you cover the raw fruits and vegetables in the jars or cans when you used the raw pack method? (Circle as many numbers as apply)

1 Used boiling liquid
2 Used hot, but not boiling liquid
3 Used cold liquid
4 Did not add liquid

16. Did you fill any of your jars or cans with heated fruits and vegetables other than jams or jellies in preparing them for canning? (This is called the hot pack method) (Circle one number)

1 Yes *154*
2 No → Please skip to Question 19

17. How did you pack the heated fruits and vegetables into jars or cans when you used the hot pack method? (Circle one number)

1 Tightly
2 Fairly loosely
3 Loosely

155

18. How did you cover the heated fruits and vegetables in the jars or cans when you used the hot pack method? (Circle as many numbers as apply)

1 Used boiling liquid
2 Used hot, but not boiling liquid
3 Used cold liquid
4 Did not add liquid

19. Did you check the jars or cans the day after canning to see if they were sealed? (Circle one number)

1 Yes
2 No → Please skip to Question 22

157

20. Did you have any jars or cans that were not sealed? (Circle one number)

1 Yes
2 No → Please skip to Question 22

21. What did you do with the fruits and vegetables in the unsealed jar(s) or can(s)? (Circle as many numbers as apply)

1 Discarded
2 Recanned (starting as if food were fresh)
3 Froze food
4 Used immediately
5 Other (Please write in)

_____

159

22. How do you prepare home-canned vegetables for eating? (Circle as many numbers as apply)

1 Serve as is with no further heating
2 Bring to a boil
3 Boil covered for 10 minutes or more
4 Heat in oven
5 Other (Please write in)

_____

23. In general, what is the longest length of time you keep home-canned fruits and vegetables from the time you can or preserve them until they are eaten? (Circle one number)

1 Less than 6 months
2 6 months to 1 year
3 More than 1 year

161

162:x

Which of the signs listed could mean that home-canned or commercially-canned foods are spoiled? (Circle as many numbers as apply)

1 Bulging lid
2 Leakage
3 Mold
4 Off-odor
5 Off-color
6 Floating fruit or vegetable
7 Spurting liquid when container is opened
8 Don't know

205

25. Could home-canned or commercially-canned foods be spoiled without any sign of spoilage, or would there always be some sign of spoilage? (Circle one number)

1 Could be spoiled without any sign
2 Would always be some sign of spoilage
3 Don't know

206

26. Did any fruits or vegetables you home canned in 1975 spoil? (Circle one number)

207

1 Yes
2 No → Please skip to Question 32

27. Which of the foods listed below spoiled and what method(s) did you use for canning or preserving them? (Circle the appropriate numbers)

	Boiling-water bath	Pressure cooker (saucepan)	Pressure canner	Oven	Open-kettle	
a. Fruits	1	2	3	4	5	208
b. Tomatoes	1	2	3	4	5	
c. Tomato sauce	1	2	3	4	5	
d. Other vegetables	1	2	3	4	5	
e. Vegetable mixtures	1	2	3	4	5	212
f. Pickles	1	2	3	4	5	
g. Jams	1	2	3	4	5	
h. Jellies	1	2	3	4	5	215

28. Do you have any idea what caused these foods to spoil? (Circle one number)

216

1 Yes
2 No → Please skip to Question 30

29. What do you think caused these foods to spoil?

(Circle as many numbers as apply)

1 Lids did not seal
2 Food was overripe
3 Food was processed for too short a time
4 Pressure gauge on canner was not accurate
5 Wrong processing method was used
6 Wrong size of jar was used
7 Food was packed too tightly into jar
8 Other (Please write in) _____

_____

217-18

30. What kinds of jars or cans were used in canning the food that spoiled?

(Circle as many numbers as apply)

1 Tin cans designed for home canning → (Please skip to Question 32 if only tin cans were used.)
2 Jars designed for home canning
3 Other jars, such as peanut butter, coffee, salad dressing

219

31. What kind(s) of jar lids or tops were used in canning the food that spoiled?

(Circle as many numbers as apply)

1 New flat metal lid, metal band (two-piece)
2 Reused flat metal lid, metal band (two-piece)
3 Porcelain-lined zinc cap with rubber ring
4 Glass with rubber ring and wire bail
5 Glass with rubber ring and metal band
6 Plastic flat lid with metal band
7 Plastic film
8 Paraffin
9 Other (Please write in) _____

_____

220-21

32. Whether or not they came from your garden, did you or anyone in your household can or preserve any fruits or vegetables in 1974? (Circle one number)

1 Yes
2 No → Please skip to Question 34

222

33. Did any of the fruits and vegetables that were canned in 1974 spoil? (Circle one number)

1 Yes
2 No

223

34. Do you or don't you plan to can or preserve any fruits or vegetables in 1976? (Circle one number)

1 Plan to
2 Do not plan to
3 Have already canned some
4 Not sure

224

Please write in your name, address, and telephone number. They will be used for interview verification purposes only. After verification they will be deleted from this form so they will not be given to or used by anyone else.

NAME: _____ ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

TELEPHONE NUMBER: _____

IF YOU DO NOT DO HALF OR MORE OF THE GROCERY SHOPPING IN THIS HOUSEHOLD PLEASE FILL IN THE FOLLOWING:

What is your age please? _____ 225-26

Were you employed anytime during 1975?

1 Yes, employed
2 No, not employed

227

IF EMPLOYED:

Approximately how many weeks were you employed? _____ 228-29

Approximately how many hours a week did you work? _____ 230-31

What is the highest grade (or year) of school you have completed? (Circle one number)

Elementary school (grade or year)	1	2	3	4	5	6	7	8
High school (grade or year)	9	10	11	12				
College (academic year)	1	2	3	4	5	6 or more		
Vocational or other school beyond high school	1	2	3	4 or more				

232

233

234

X Never attended school

Thank you very much for taking part in this survey.

LOCATION NO.:_____ *105-09*

HOUSING UNIT NO.:_____ *110-11*

TIME BEGAN:_____

OMB. No. 40-S-76011
Expires June 1977
RAC 3849
Revised

HOME FOOD PRESERVATION SCREENING QUESTIONNAIRE

Hello. My name is _____ of Response Analysis Corporation in Princeton, New Jersey. May I speak with the person who does half or more of the food shopping for this household? (IF NO HOUSEHOLD MEMBER DOES HALF OR MORE OF THE FOOD SHOPPING, ASK TO SPEAK TO THE PERSON WHO HAS THE MAJOR RESPONSIBILITY FOR PREPARING FOOD FOR THE HOUSEHOLD MEMBERS' USE.)

TO ELIGIBLE RESPONDENT: We are conducting a national survey on behalf of the U.S. Department of Agriculture. All of the information in the interview will be held in strict confidence.

1. Did anyone in your household have a fruit or vegetable garden in 1975?

   1 YES
   2 NO ⟶ SKIP TO Q. 3 *112*

IF "YES" ON Q. 1, ASK:

USE CARD 0

2. Here is a list of fruits and vegetables. Which of these were grown in the garden in 1975? Just read me the numbers, please (PROBE: Any others?)

   1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

   18 19 20 21 22 23 24 25 OTHER (SPECIFY)_____ *113-115*

3. Whether or not they came from your household garden, did you or anyone in your household freeze any fruits or vegetables in 1975?

   1 YES
   2 NO ⟶ SKIP TO Q. 5 *116*

IF "YES" ON Q. 3, ASK:

4. Which fruits or vegetables were frozen?

   1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

   18 19 20 21 22 23 24 25 OTHER (SPECIFY)_____ *117-119*

   (IF A MIXTURE, BE SURE TO RECORD ALL FRUITS AND VEGETABLES)

5. Whether or not they came from your household garden, did you or anyone in your household can or preserve any fruits or vegetables in 1975?

   1 YES, RESPONDENT CANS ⟶ GIVE THE HOME CANNING QUESTIONNAIRE AFTER ASKING QUESTIONS 6-17 *120*

   2 YES, OTHER HOUSEHOLD MEMBER CANS ⟶ ASK RESPONDENT QUESTIONS 6-17, THEN GIVE THE HOME CANNING QUESTIONNAIRE TO THE HOME CANNER

   3 NO ⟶ SKIP TO QUESTION 10 (BACKGROUND QUESTIONS)

IF "YES" ON Q. 5, ASK:

6. Which fruits or vegetables were canned or preserved?

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 *121-123*

18 19 20 21 22 23 24 25 Other (specify)_____

(IF A MIXTURE, BE SURE TO RECORD ALL FRUITS AND VEGETABLES)

TAKE BACK CARD O

7. Did you or anyone in your household have any difficulty getting lids, jars, or other things needed for canning or preserving in 1975?

1 YES
2 NO ——→SKIP TO Q. 10 *124*

IF "YES" ON Q. 7, ASK:

8. What things were difficult to get? (DO NOT READ THINGS)

1 LIDS 2 JARS 3 CAPS 4 RUBBER RINGS 5 OTHER (SPECIFY)_____ *125*

9. What effect, if any, did this difficulty have on the amount of canning or preserving done in your household in 1975? Was less canned or preserved than was planned, were some fruits or vegetables frozen that would have been canned or preserved, or was there no change as a result of the difficulty?

1 CANNED OR PRESERVED LESS THAN PLANNED
2 FROZE SOME FRUITS OR VEGETABLES THAT WOULD HAVE CANNED OR PRESERVED
3 NO CHANGE *126*

When we put together all the things people have told us, we group together the answers from people who are alike in one or more ways. To know into which groups to put your answers, we need to know something about you and your household.

10. What is your age, please? _____ *127-28*

11. Are you presently employed?

1 YES
2 NO *129*

12. Were you employed any time during 1975? 1 YES, EMPLOYED
2 NO, NOT EMPLOYED *130*

IF "YES, EMPLOYED" ON Q. 12, ASK:

13. Approximately how many weeks were you employed? _____ *131-32*

14. Approximately how many hours a week did you work? _____ *133-34*

15. Please tell me how many persons who live here now, including yourself, are in the following age groups: (ASK FOR EACH GROUP)

1	Under 6 _____ *135*	6	35 - 44 _____ *140*
2	6 - 11 _____ *136*	7	45 - 54 _____ *141*
3	12 - 17 _____ *137*	8	55 - 64 _____ *142*
4	18 - 24 _____ *138*	9	65 and over _____ *143*
5	25 - 34 _____ *139*		

16. What is the highest grade (or year) of school you have completed?

ELEMENTARY SCHOOL (GRADE OR YEAR)	1 2 3 4 5 6 7 8	*144*
HIGH SCHOOL (GRADE OR YEAR)	9 10 11 12	
COLLEGE (ACADEMIC YEAR)	1 2 3 4 5 6 OR MORE	*145*
VOCATIONAL OR OTHER SCHOOL BEYOND HIGH SCHOOL	1 2 3 4 OR MORE	*146*
	X NEVER ATTENDED SCHOOL	

HAND RESPONDENT CARD T

17. Could you tell me approximately what your total family income was in 1975 before taxes? Just give me the number.

1 2 3 4 5 6 7 8 9 10 11 12 13 DON'T KNOW 14 REFUSED *147-48*

TAKE BACK CARD T

BY OBSERVATION, SEX OF RESPONDENT: 1 FEMALE 2 MALE *149*

May I please have your name address, and phone number? This information will be used for interview verification purposes only. After verification, your name, address and phone number will be DELETED from this form so they will not be given to or used by anyone else. Your answers are kept confidential.

RESPONDENT NAME:_____

ADDRESS:_____

CITY:_____ STATE:_____ ZIP:_____

TELEPHONE NUMBER: AREA CODE (____)_____

THANK RESPONDENT FOR HER/HIS HELP

INSTRUCTION TO VERIFIER: ABOVE INFORMATION WILL BE DELETED AFTER VERIFICATION.

INTERVIEWER NAME:_____

TIME FINISHED:_____ LENGTH OF INTERVIEW:_____MINUTES *150-51*

DATE OF INTERVIEW:_____

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